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HIGH-SCHOOL COSTS

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Accurate cost-accounting lies at the foundation of all successful business management. In railroad administration, for example, it is known that under usual normal conditions locomotive repair-cost should average about six cents per mile-run; lubricating oils should cost about eighteen cents per hundred miles for passenger locomotives, and about twenty-five cents for freight locomotives; and so on for each item involved in the entire management. With these cost-standards at hand, derived from wide general practice, if a railroad manager finds at the end of the year that locomotive repairs average fifteen cents per mile-run, then it is quite evident upon the surface that something is wrong somewhere. The railroad is paying too high wages to labor; it is getting too little labor for the amount expended; its labor force is working under adverse conditions; there is graft in the repair department; or the entire outfit of locomotives is in a sad state of depreciation. When the cost runs so high above standard, something needs to be investigated, and either shown to be the result of unusual conditions, or corrected. If, on the other hand, the repair-cost is running at three cents per mile on an average, and if unusual conditions do not exist, then it appears probable

that locomotives are being left to depreciate too rapidly. Cost-accounting is thus seen to be one method of diagnosing the situation and locating irregularities of management.

In operating a high school, expenditures need to be made for many things—general administration, supervision, instruction, fuel, janitors, light, power, library, etc. For each of these, standard unit-costs are needed for judging the efficiency of the management. If it is known, for example, that satisfactory instruction in high-school English can be had for fifty dollars per thousand student-hours, and that this price represents the norm of practice, then those responsible for high-school management have a standard of judgment that can be used for measuring the efficiency of their practices. If instruction in this subject is costing them $75 per 1,000 student-hours, and they are aiming at results of only the usual sort, it is evident that they are wasting money, and that administrative adjustments need to be made. If they are getting this commodity for $30 per thousand student-hours, then it is probable that they are practicing so great an economy as seriously to injure the quality of the work.

There can be nothing final about such standards of practice; and they need to be set up anew each year. They afford a fact-basis of judgment, however, that is superior to mere arbitrary opinions as to what ought to be invested in the thing in question.

The present study deals with the single item of instruction. The figures here presented represent the results of a co-operative study undertaken by the superintendents or high-school principals of the cities and towns named in the tables and charts. The primary purpose of the study is to present a *method* of finding standards of practice and of comparing individual schools with such standards. The figures were furnished by many individuals. And owing to different methods of organization and of accounting in different schools, it is probable that the same basis is not always used. It is too much to hope, therefore, that the figures are always entirely accurate. They are moderately accurate for most of the cities—unfortunately not always—and roughly serve our major purpose of suggesting a method that ought to be currently used by co-operating groups of high schools.

MATHEMATICS

How much ought a community to be expected to pay for instruction in high-school algebra and geometry? Table I shows the actual prices paid for this commodity in twenty-five co-operating high schools. The cost-unit is the student-hour. This means the instruction of one student for one hour of sixty minutes. For purposes of representation and comparison there are several reasons for preferring the "cost per 1,000 student-hours." We have therefore used this number of cost-units in all of the tables and charts.

TABLE I

MATHEMATICS.—COST OF INSTRUCTION IN HIGH-SCHOOL MATHEMATICS PER 1,000 STUDENT-HOURS, 1913

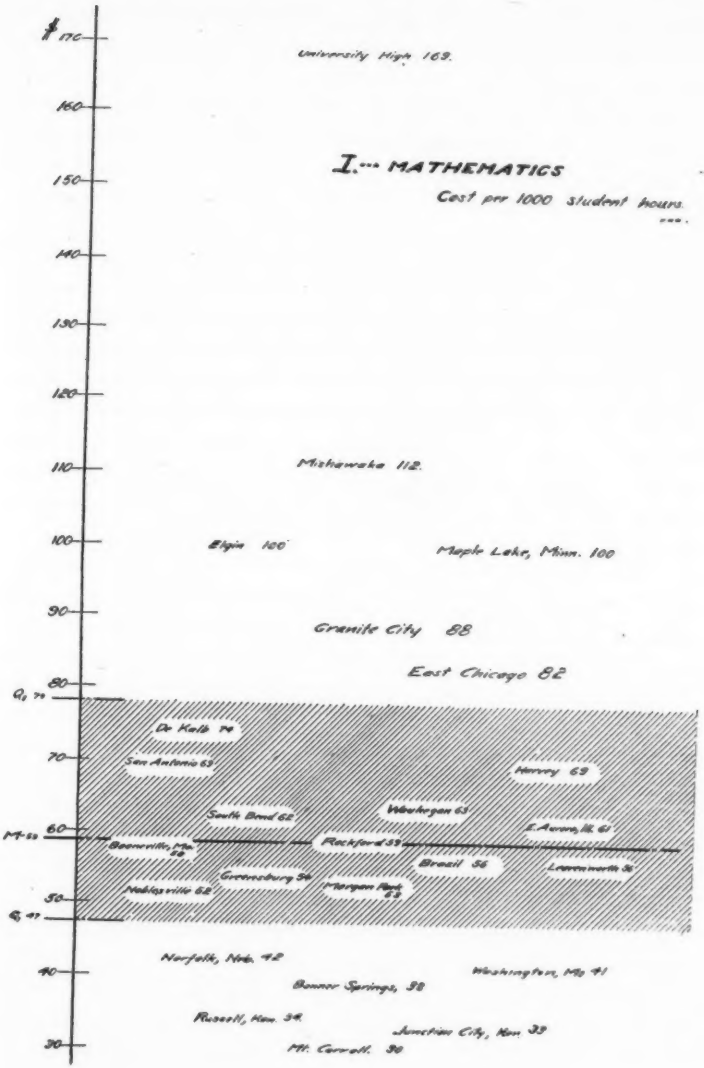
	Cost per 1,000 Student-Hours
University High	$169
Mishawaka, Ind	112
Elgin, Ill	100
Maple Lake, Minn	100
Granite City, Ill	88
East Chicago, Ind	82
DeKalb, Ill	74
San Antonio, Tex	69
Harvey, Ill	69
Waukegan, Ill	63
South Bend, Ind	62
East Aurora, Ill	61
Rockford, Ill	59
Booneville, Mo	58
Brazil, Ind	56
Leavenworth, Kan	56
Greensburg, Ind	54
Morgan Park, Ill	53
Noblesville, Ind	52
Norfolk, Neb	42
Washington, Mo	41
Bonner Springs, Kan	38
Russell, Kan	34
Junction City, Kan	33
Mt. Carroll, Ill	30

All but four of these schools are accredited by the North Central Association. They are all presumably attempting to secure similar results in mathematics. The actual results secured in the different high schools are probably not greatly different. Colleges estimate them as relatively equal in their entrance valuations. Yet one high school is getting these results for $30 per 1,000 student-hours, while another is paying more than five times as much. Looking only to public high schools, certain ones are paying more than three times as much. The University and the DeKalb high schools, by the way, are used for practice teaching and observation. They are therefore attempting something more than the usual public high school, and it is but natural that they should have to pay more for the additional results.

Fifty-nine dollars paid in Rockford is the median price paid for algebra and geometry. There is no reason to think that the results obtained in Rockford are in any degree inferior to those obtained in the dozen cities paying a higher price. Fifty-nine dollars for mathematics represents the consensus of practice and is a *safe* standard of judgment for high schools.

Such a standard of practice is too rigid for universal application. The diversity represented by the middle half of the cities is probably normal. The standard of practice should probably be so formulated as to permit the flexibility of practice found in this middle 50 per cent of cities. We can say, therefore, that between $52 and $74 is a safe standard price for high-school mathematics. This we shall call the "zone of safety." Those cities that fall below the lower limits of this central zone—presuming that we had a homogeneous class, which is in fact not here the case—are either overworking their teachers or underpaying them; or they may be doing both. The facts show either that the communities need to exert themselves somewhat more, or that the schools are in need of state aids so as to equalize effort in the different cities.

The tabular mode of presenting the facts is not so convincing to a community as a graphical one. In Chart I the median M and the "zone of safety" between the quartiles Q–I and Q–III show in spatial terms the safe levels for any city. The chart is particularly designed to show this exceptional standing of


$
170
160
150
140
130
120
110
100
90
80
70
60
50
40
30
Q₃ 71
M 62
Q₁ 47
University High 169.
I.··· MATHEMATICS
Cost per 1000 student hours.
Mishawaka 112.
Elgin 100
Maple Lake, Minn. 100
Granite City 88
East Chicago 82
De Kalb 74
San Antonio 65
Harvey 69
South Bend 62
Waukegan 63
E. Aurora, Ill. 61
Boonville, Mo. 62
Rockford 59
Brazil 56
Leavenworth 56
Greensburg 56
Morgan Park 52
Noblesville 62
Norfolk, Neb. 42
Washington, Mo. 41
Bonner Springs, 38
Russell, Kan. 34
Junction City, Kan. 33
Mt. Carroll. 30

those that fall outside the "zone of safety," and the degree of such exceptionalness.

LATIN

Latin is another subject in which the aims, methods, and materials of the various high schools are relatively uniform. Not even in the mathematics has the content of the work been so thoroughly standardized; yet Table II shows that the diversity of prices paid for Latin instruction is very great. The price of Latin is much higher than that of mathematics; but still those who are paying most for it are expending four or five times as much per 1,000 student-hours as those who are paying least. The table shows rather clearly that, while we have been standardizing the content of the work and certain aspects of the teaching, we have not yet standardized the administrative aspects of the problem.

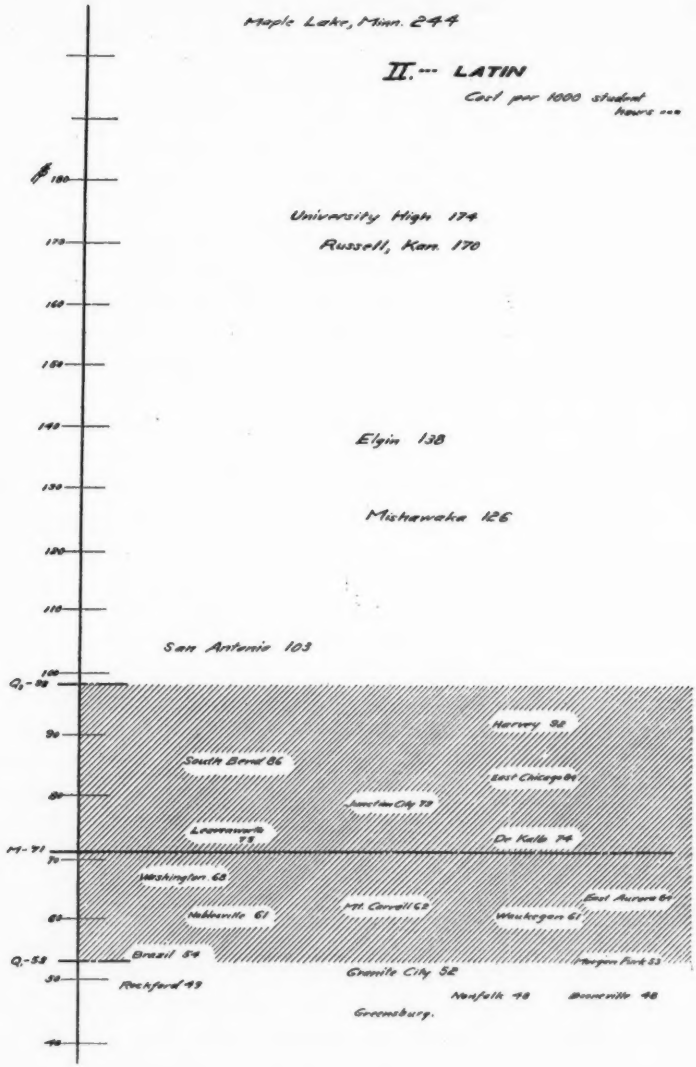
TABLE II

LATIN.—COST OF INSTRUCTION IN HIGH-SCHOOL LATIN PER 1,000 STUDENT-HOURS, 1913

	Cost per 1,000 Student-Hours
Maple Lake, Minn	$244
University High	174
Russell, Kan	170
Elgin, Ill	138
Mishawaka, Ind	126
San Antonio, Tex	103
Harvey, Ill	92
South Bend, Ind	86
East Chicago, Ind	84
Junction City, Kan	79
Leavenworth, Kan	75
DeKalb, Ill	74
Washington, Mo	68
East Aurora, Ill	64
Mt. Carroll, Ill	62
Waukegan, Ill	61
Noblesville, Ind	61
Brazil, Ind	54
Morgan Park, Ill	53
Granite City, Ill	52
Rockford, Ill	49
Norfolk, Neb	48
Booneville, Mo	48
Greensburg, Ind	46

Seventy-one dollars is the median cost of Latin instruction. This is a 20 per cent higher price than that paid for high-school mathematics. This cannot be due to the greater value of the subject, to any diminished supply of the commodity, or to higher salaries paid the teachers. It is simply due to administrative maladjustments in the teaching of the Latin on the side of size of classes and number of teaching-hours per week. It is interesting to observe the highly extravagant price paid by certain villages that really can least afford such wastefulness. Maple Lake is probably getting no more results for each 1,000 student-hours than is DeKalb at one-third the cost or Rockford at one-fifth of the cost. Practical men, before buying wheat, or cotton, or railroad stocks, examine into market conditions and pay something in the neighborhood of current market prices. These figures appear to indicate that the same practical school-board members, when they are investing the people's money in a supposedly necessary community commodity, are, certain of them, paying prices very greatly in excess of current market prices as represented by the standards of practice in those cities that lie within the "zone of safety." It probably is sufficiently extravagant to pay even the price of $90 for its Latin, when the median city is getting it done for $71. When the same city is getting its mathematics for $59 and its English for $51, it is more than probable that the upper limit of our middle zone in this case represents wasteful extravagance; and that it is the lower portion of the middle zone that more nearly represents safety.

The administrative readjustments necessary for bringing costs within the limits of the zone of middle practice must concern themselves chiefly with the size of classes, with length of recitation periods, and with frequency of class meetings. Small classes can accomplish just as much per pupil with fewer meetings per week, or with shorter meetings, than the so-called standard period. In a subject where there is a tendency for classes to grow smaller in size, as is the case with the Latin at present, it is possible to organize new classes annually instead of semiannually, or even biennially instead of annually in the smaller high schools. It is easily possible for the high schools that transcend the flexible standard of the central zone of safety to bring the costs down to the standard without any


Maple Lake, Minn. 244
II. --- LATIN
Cost per 1000 student hours ---
180
University High 174
170
Russell, Kan. 170
160
150
140
Elgin 138
130
Mishawaka 126
120
110
San Antonio 103
100
Q_3 - 98
90
Harvey 92
South Bend 86
East Chicago 84
80
Junction City 79
Leavenworth 75
De Kalb 74
M - 71
70
Washington 63
Nebbeville 61
Mt. Carroll 60
Waukegan 61
East Aurora 64
60
Q_1 - 53
Brazil 54
Morgan Park 53
Granite City 52
50
Rockford 49
Norfolk 48
Boonville 48
Greensburg.
40

loss in educational results when measured by the results obtained in the cities of the middle zone. These readjustments will necessitate the provision for a larger amount and certainly a desirable amount of flexibility in current standards relating to size of classes, length of periods, and number of periods per week, in small accredited high schools. The present rigidity is inimical to administrative efficiency.

ENGLISH

English is a subject of instruction in which the content is much less completely standardized than mathematics or Latin, yet we find the diversity of costs and therefore the diversity of administrative practices to be somewhat less. Table III shows that the median cost is $51. It is much less expensive than Latin or mathe-

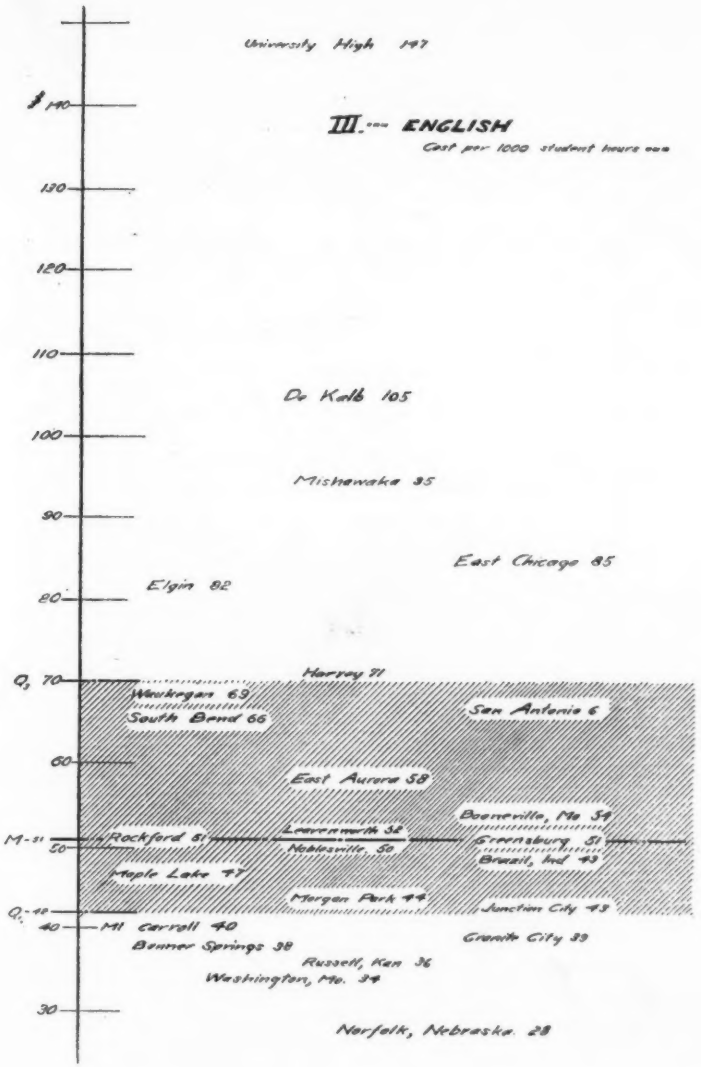
TABLE III

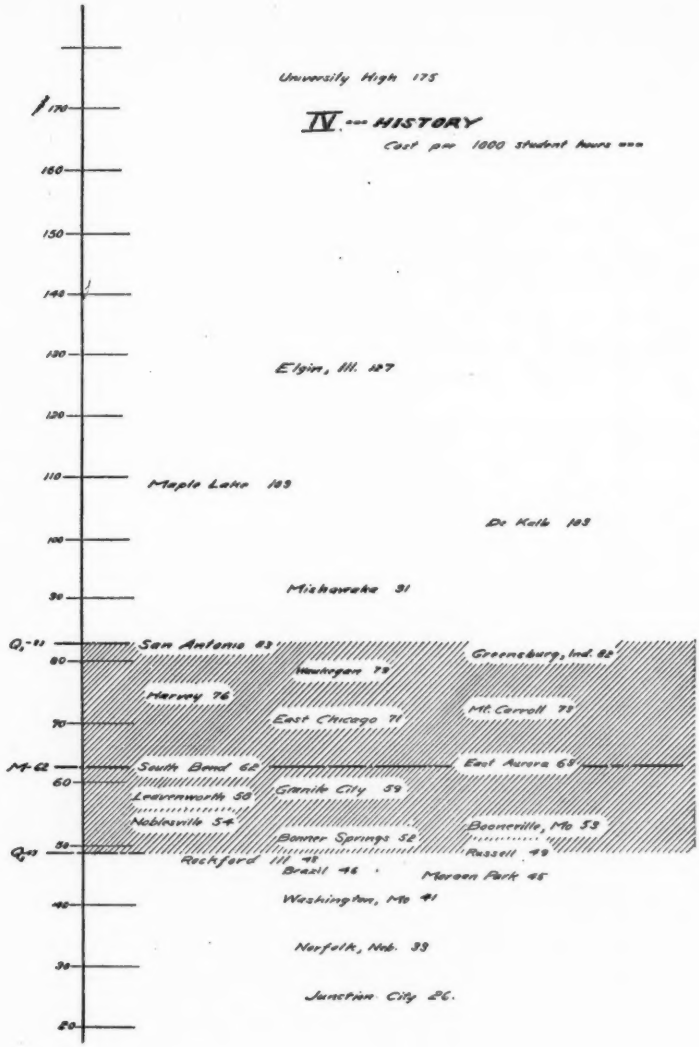
ENGLISH.—COST OF INSTRUCTION IN HIGH-SCHOOL LATIN PER 1,000 STUDENT-HOURS, 1913

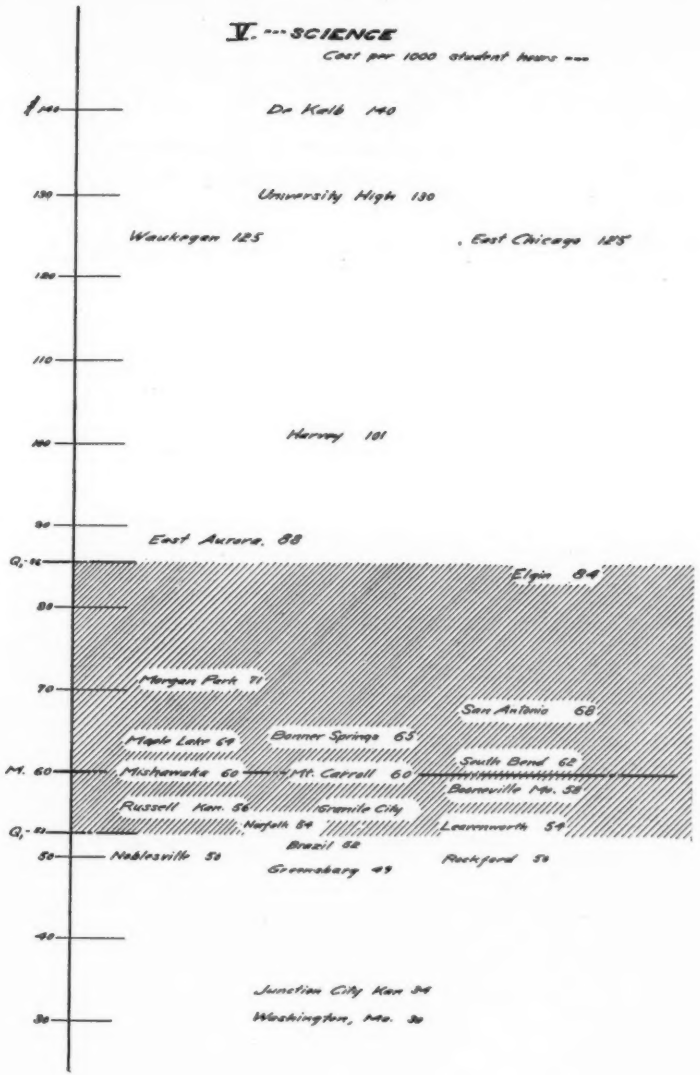
	Cost per 1,000 Student-Hours
University High	$147
DeKalb, Ill	105
Mishawaka, Ind	95
East Chicago, Ind	85
Elgin, Ill	82
Harvey, Ill	71
Waukegan, Ill	69
San Antonio, Tex	67
South Bend, Ind	66
East Aurora, Ill	58
Booneville, Mo	54
Leavenworth, Kan	52
Rockford, Ill	51
Greensburg, Ind	51
Noblesville, Ind	50
Brazil, Ind	49
Maple Lake, Minn	47
Morgan Park, Ill	44
Junction City, Kan	43
Mt. Carroll, Ill	40
Granite City, Ill	39
Bonner Springs, Kan	38
Russell, Kan	36
Washington, Mo	34
Norfolk, Neb	28

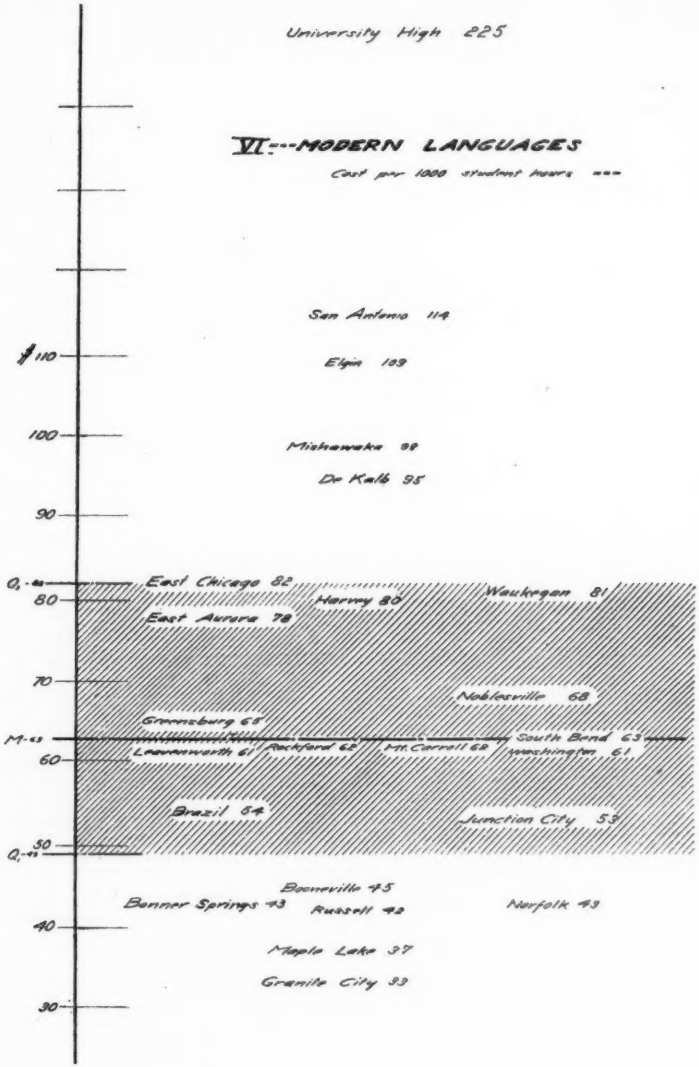
matics. The entire zone of safety falls below the median price of the Latin. Cities are paying less probably, not because the English is worth less, but because in obedience to unduly rigid administrative requirements it is possible to make desirable administrative adjustments in a subject like English which all students take, that under present conditions are not possible in a subject like Latin, which is taken by only a portion of the students. While we are here finding standards of judgment for the administration of the individual subjects within those subjects themselves, yet there is clear justification for using in subjects like Latin and mathematics standards not greatly dissimilar to those of English. It is altogether probable that the lower median and zone of flexibility valid for English instruction should be valid also for mathematics or Latin.

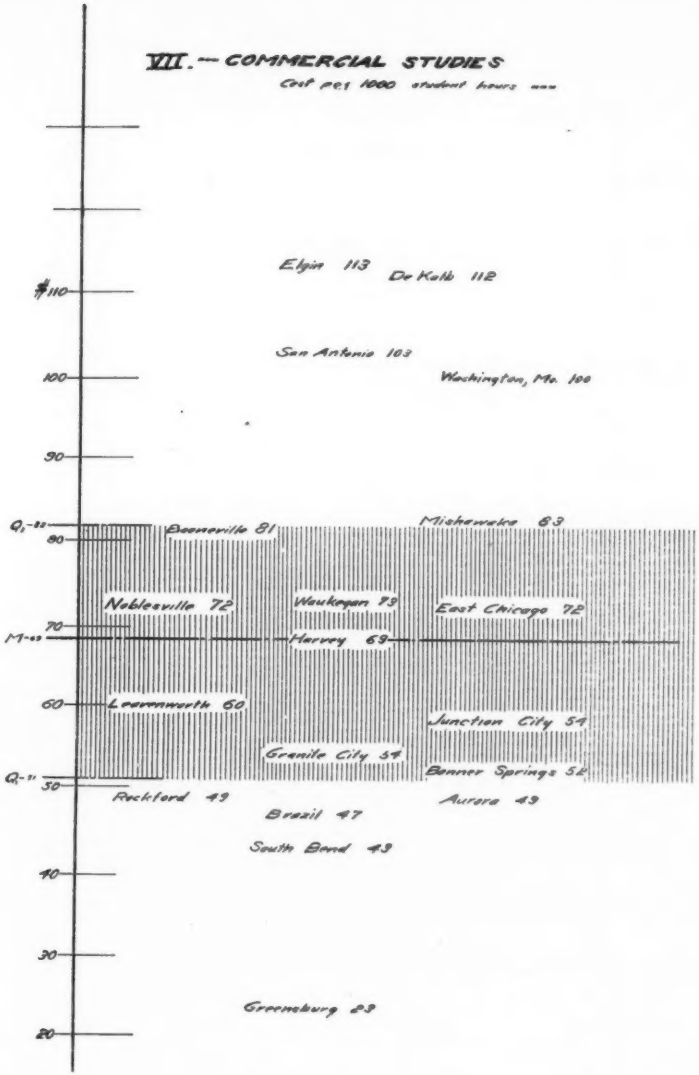
Owing to the fact that current practice is so different in different subjects it is necessary to determine medians and zones of central range for each of the different studies separately. The conditions surrounding certain of the subjects, as for example manual training, music, science, etc., differ so greatly that it is not desirable that classes should be of the same size, or that instructors should always have the same number of hours of class work per day. The salary situation likewise differs with the subject taught. The charts that follow indicate the situations with reference to each of the more common high-school subjects so far as the data at hand can reveal such situations.

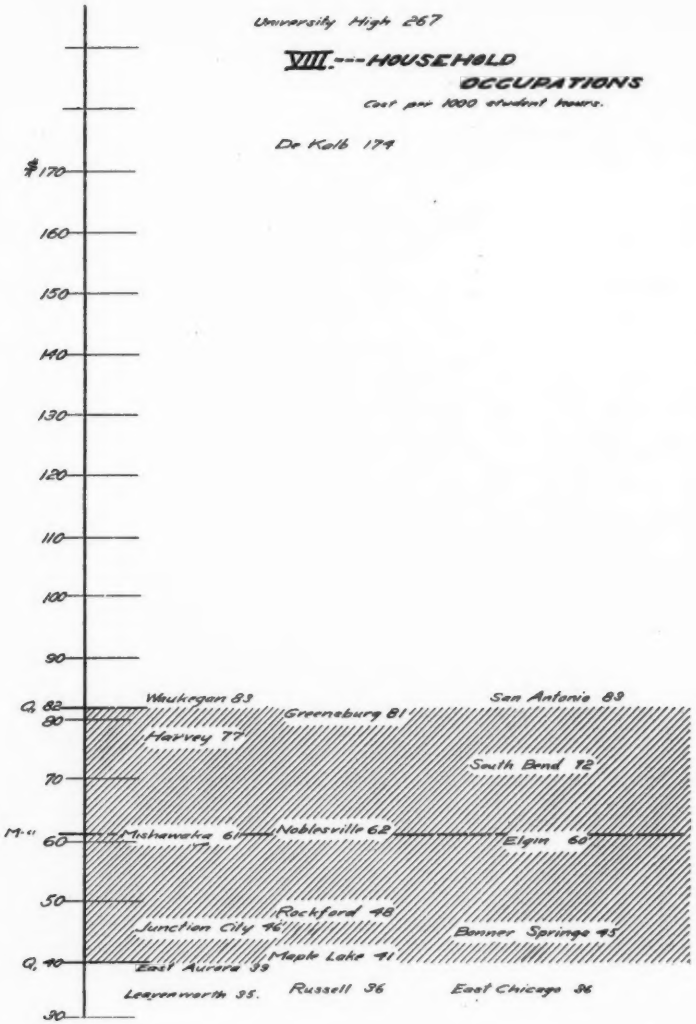

University High 147
$ 140
III.--- ENGLISH
Cost per 1000 student hours ave
130
120
110
De Kalb 105
100
Mishawaka 95
90
East Chicago 85
Elgin 82
80
Harvey 71
Q3 70
Waukegan 69
South Bend 66
San Antonio 6
60
East Aurora 58
Boonville, Mo 54
Rockford 51
Leavenworth 52
Strasburg 51
M-51
50
Noblesville, 50
Brazil, Ind 49
Maple Lake 47
Morgan Park 44
Junction City 43
Q1 40
40
Mt Carroll 40
Granite City 39
Bonner Springs 38
Russell, Kan 36
Washington, Mo. 34
30
Norfolk, Nebraska. 28

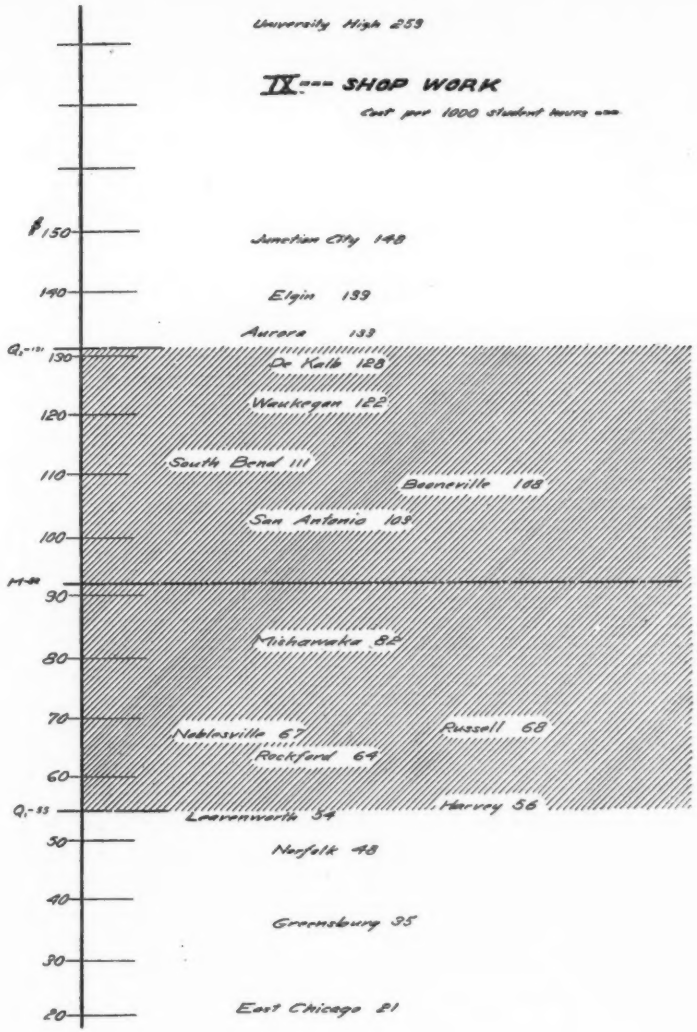

University High 175
IV. --- HISTORY
Cost per 1000 student hours ---
170
160
150
140
130
Elgin, Ill. 127
120
110
Maple Lake 103
De Kalb 103
100
90
Michawaka 91
Q1-11
San Antonio 83
Greensburg, Ind. 82
80
Hamtramck 79
Harvey 76
East Chicago 71
Mt. Carroll 79
70
M-62
South Bend 62
East Aurora 65
60
Leavenworth 58
Granite City 59
Nobleville 54
Boonville, Mo 53
Q3-50
Bonner Springs 52
Russell 49
Rockford Ill 48
Brazil 46
Maroon Park 45
40
Washington, Mo 41
Norfolk, Neb. 39
30
Junction City 26.
20

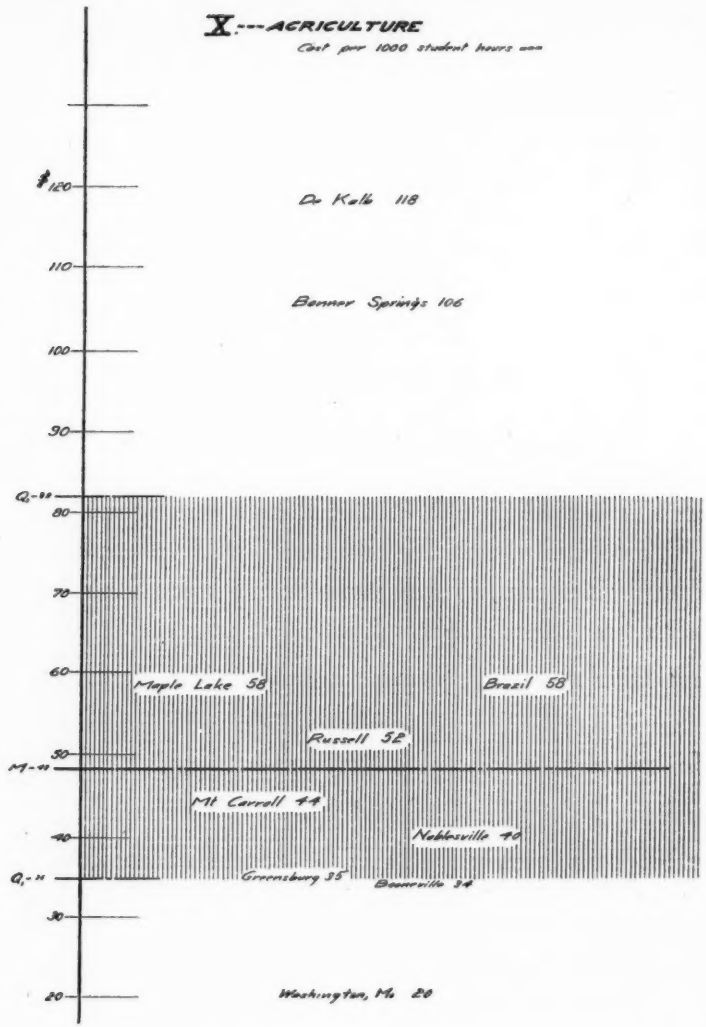

V. --- SCIENCE
Cost per 1000 student hours ---
140
130
120
110
100
90
80
70
M. 60
50
40
30
De Kalb 140
University High 130
Waukegan 125
East Chicago 125
Harvey 101
East Aurora, 88
Elgin 84
Morgan Park 71
San Antonio 68
Maple Lake 64
Banner Springs 65
South Bend 62
Mishawaka 60
Mt. Carroll 60
Beardsville Mo. 58
Russell Kan. 56
Granite City
Norfolk 84
Leavenworth 54
Brazil 52
Neblesville 50
Greensburg 49
Rockford 50
Junction City Kan 34
Washington, Mo. 30

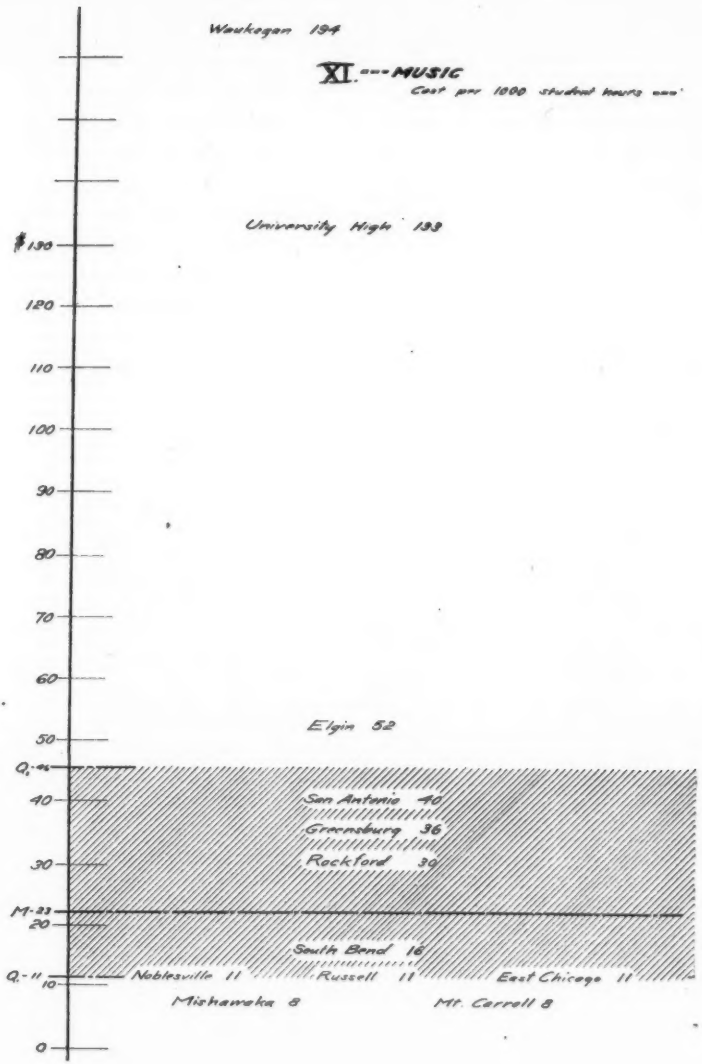

University High 225
VI.---MODERN LANGUAGES
Cost per 1000 student hours ---
San Antonio 114
Elgin 109
Mishawaka 98
De Kalb 95
110
100
90
80
70
60
50
40
30
East Chicago 82
Harvey 80
Waukegan 81
East Aurora 78
Noblesville 68
Greensburg 65
Leavenworth 61
Rockford 62
Mt. Carroll 62
South Bend 63
Washington 61
Brazil 54
Junction City 53
Boneville 45
Bonner Springs 43
Russell 42
Norfolk 43
Maple Lake 37
Granite City 33

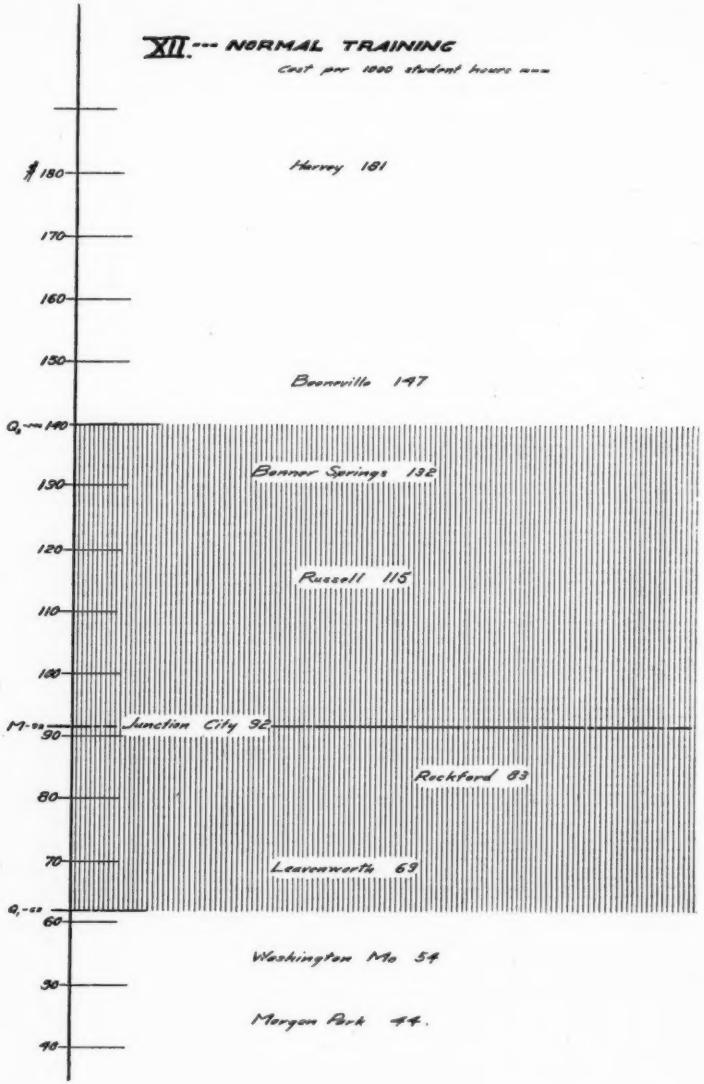

VII.—COMMERCIAL STUDIES
Cost per 1000 student hours
Elgin 113
De Kalb 112
110
San Antonio 103
100
Washington, Mo. 100
90
Q3-82
Beaverville 81
Michewaka 83
80
Noblesville 72
Waukegan 73
East Chicago 72
70
M-65
Harvey 69
60
Leavenworth 60
Junction City 54
Granite City 54
Q-1" 50
Bonner Springs 52
Rockford 49
Aurora 49
Brazil 47
South Bend 43
40
30
Greensburg 23
20


University High 267
VIII.---HOUSEHOLD OCCUPATIONS
Cost per 1000 student hours.
De Kalb 179
#170
160
150
140
130
120
110
100
90
Q. 82
80
Waukegan 83
Greensburg 81
San Antonio 89
Harvey 77
South Bend 72
70
M. 61
60
Mishawaka 61
Noblesville 62
Elgin 60
50
Rockford 48
Junction City 46
Bonner Springs 45
Q. 40
Maple Lake 41
East Aurora 39
Leavenworth 35.
Russell 36
East Chicago 36
30

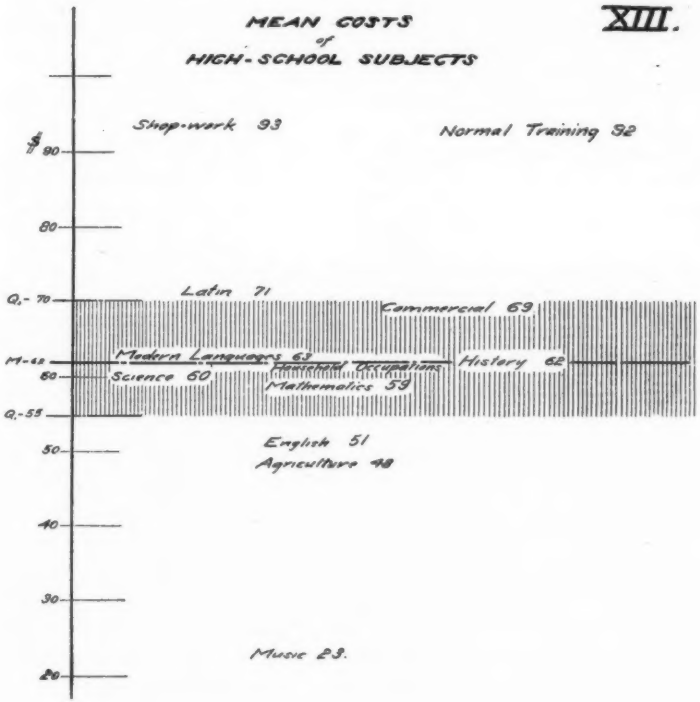

University High 259
IX.--- SHOP WORK
Cost per 1000 student hours ---
150
Junction City 148
140
Elgin 139
Aurora 133
130
De Kalb 128
Waukegan 122
120
South Bend 111
110
Beaneville 108
San Antonio 108
100
90
Michawaka 82
80
70
Nablesville 67
Rockford 64
Russell 68
60
Harvey 56
Leavenworth 54
50
Norfolk 48
40
Greensburg 35
30
East Chicago 21
20


X.---AGRICULTURE
Cost per 1000 student hours ---
$120
110
100
90
Q.-80
80
70
60
50
M.-40
40
Q.-30
30
20
De Kalb 118
Bonnar Springs 106
Maple Lake 58
Brazil 58
Russell 52
Mt Carroll 44
Nebbeville 40
Greensburg 35
Bonneville 34
Washington, Mo 20


Waukegan 194
XI.---MUSIC
Cost per 1000 student hours ---
University High 138
130
120
110
100
90
80
70
60
50
Q.-94
40
30
M-23
20
Q.-11
10
0
Elgin 52
San Antonio 40
Greensburg 36
Rockford 39
South Bend 16
Noblesville 11
Russell 11
East Chicago 11
Mishawaka 8
Mt. Carroll 8


XII. --- NORMAL TRAINING
Cost per 1000 student hours ---
180
170
160
150
140
130
120
110
100
90
80
70
60
30
40
Harvey 181
Booneville 147
Q3 --- 140
Q1 --- 90
M --- 92
Q1 --- 60
Banner Springs 132
Russell 115
Junction City 92
Rockford 83
Leavenworth 69
Washington Mo 54
Morgan Park 44.

The variety of prices paid for the same quantity of instruction in the various subjects is shown in Table IV and Chart XIII. The subject of median cost stands at $62. The middle zone of variability shows a range from $55 to $70. For those that now stand above this zone of normal variability it is possible that administrative readjustments are desirable for the purpose of bringing them down and thus eliminating waste. For those below this normal range of variability classes need to be cut down in size, teachers better paid, or the teaching week shortened, so as to bring them at least nearer the range of normality. In other words, just as it is possible to determine standard costs for each of the various subjects separately out of the practical situations where those subjects are taught, so it may be possible to determine flexible



standards of cost for the entire situation applicable to the entire range of subjects. Whether or not this can be profitable can be known only after such standards have been derived for high schools of homogeneous classes and involving large numbers. After the matter has been tried out its worth can be known.

TABLE IV

MEAN COST AND "ZONES OF SAFETY"

	Median Cost 1,000 Student-Hours	"Zone of Safety"
Shopwork	$93	$55–$131
Normal training	92	62– 140
Latin	71	54– 98
Commercial	69	51– 82
Modern languages	63	49– 82
History	62	49– 83
Household occupations	61	40– 82
Science	60	53– 86
Mathematics	59	47– 78
English	51	42– 70
Agriculture	48	35– 58
Music	23	11– 46

SIZE OF CLASSES

When a city finds itself paying an exceptional amount per 1,000 student-hours, whether high or low, one of the things in which corrective readjustment is possible is the size of classes. This raises the question of what is the proper size of class for the teaching of each of the different subjects. While arbitrary standards have been set up, yet as a matter of fact nobody knows what is the proper size of classes, either from experiment or from a study of the consensus of practice covering wide areas. The present study, based upon only the twenty-five high schools of heterogeneous size and situation, indicates that the number of pupils per class in every subject varies greatly. Table V shows the situation in English and mathematics in these twenty-five high schools. Although most of them are aiming at much the same results, yet the high schools with small classes are consuming more than twice as much of the teaching time and energy per pupil as the larger classes.

For English, the table shows a central range of 21 to 24 pupils per class. Were standards based upon conditions in a large number of schools of homogeneous class, then it would be safe to conclude that those at the top of the entire list are probably too large, while

TABLE V

AVERAGE SIZE OF CLASSES IN ENGLISH AND MATHEMATICS IN THE TWENTY-FIVE HIGH SCHOOLS

ENGLISH		MATHEMATICS	
School	No. Pupils	School	No. Pupils
Mishawaka	31	Mishawaka	29
San Antonio	28	Greensburg	27
Greensburg	26	San Antonio	27
Norfolk	26	Junction City	27
Harvey	25	Rockford	25
University	25	Norfolk	25
Leavenworth	24	Waukegan	24
Morgan Park	24	Leavenworth	23
South Bend	24	Morgan Park	23
Rockford	23	Noblesville	23
Elgin	23	Russell	22
Noblesville	22	South Bend	22
Russell	22	Harvey	21
East Aurora	22	Mt. Carroll	21
Junction City	21	Elgin	20
Granite City	21	East Aurora	19
Waukegan	21	University	19
Brazil	21	Brazil	19
Bonner Springs	20	Bonner Springs	19
Mt. Carroll	20	DeKalb	18
DeKalb	18	Booneville	18
Booneville	18	Granite City	16
East Chicago	16	East Chicago	15
Washington, Mo	15	Maple Lake	13
Maple Lake	14	Washington, Mo	12

those at the very bottom of the series are certainly too small for administrative economy. For the sake of educational efficiency the larger classes may need to be somewhat diminished, and for the sake of administrative economy the smaller classes need to be combined into larger ones, or, where this is impossible, adjusted as to

the number of meetings per week or the length of meeting, so that these matters will correspond with the diminished size of the class. The variation in size of classes in mathematics indicates likewise the necessity of using the standards of central practice as the basis for administrative adjustment.

The variation in the size of classes shown in English and mathematics is equally marked in the case of every other subject. It is in fact considerably greater in certain of the subjects in which the content of the work is less fully standardized. Table VI shows the

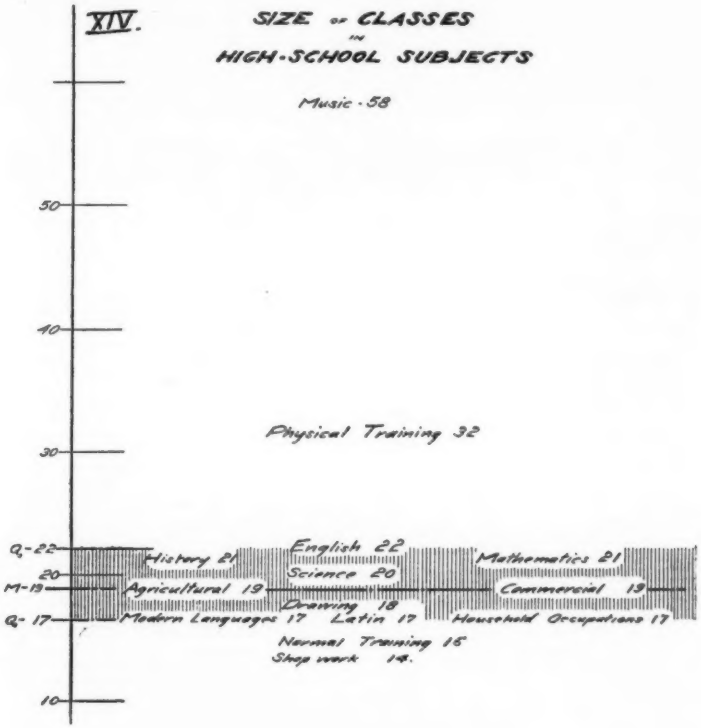
TABLE VI

SIZE OF CLASS BY SUBJECTS

	Median No. Pupils	"Zone of Safety"
Music	58	42–88 pupils
Physical training	32	28–55 "
English	22	20–24 "
Mathematics	21	18–24 "
History	21	17–23 "
Science	20	16–22 "
Agriculture	19	18–25 "
Commercial	19	15–23 "
Drawing	18	14–24 "
Modern languages	17	15–20 "
Latin	17	14–19 "
Household occupations	17	13–23 "
Normal training	15	10–21 "
Shopwork	14	12–18 "

median size of class in each of the various subjects. It also shows the range of the middle 50 per cent of the schools for each of the subjects. The table shows rather clearly why shopwork and normal training are so very expensive per 1,000 student-hours as compared with mathematics or English. It shows why English costs on an average only about 70 per cent as much as Latin for the same number of student-hours. It is clear that in these high schools classes in certain subjects need to be increased in size, or time expenditures decreased in amount. Chart XIV shows rather more

clearly than the table the relative positions of the different subjects in the matter of the size of classes.



LENGTH OF TEACHING WEEK

The number of hours per week per teacher actually devoted to the teaching of a given subject differs greatly in different high schools. For this also standards of current practice are needed. Table VII shows the diversity of practice to be found among these twenty-five high schools in the subjects of English and mathematics. While the average length of week for both of these subjects is between 23 and 24 hours, the variations upward and downward are very considerable. It must be mentioned that the

time here includes that which is devoted to supervision of the study-room. It does not include outside work or unassigned time at the school. It covers the time given to classes and to study-room.

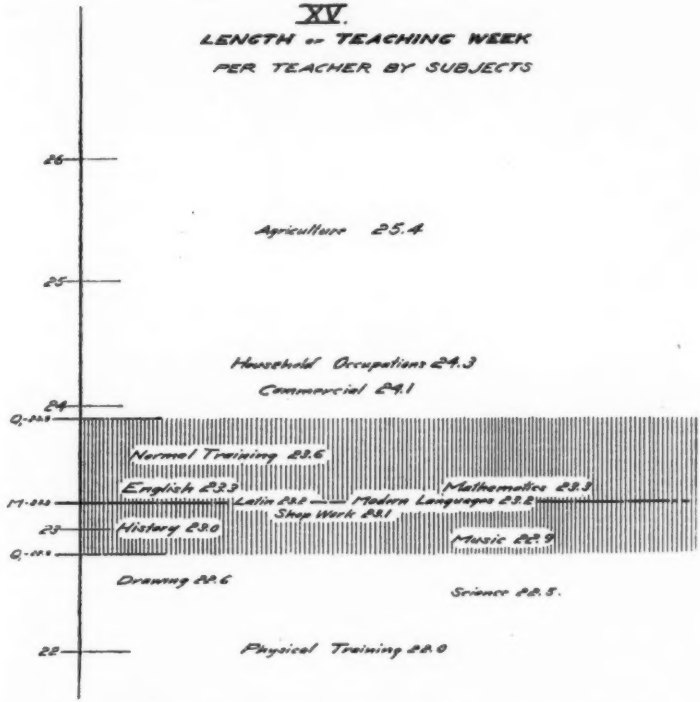
TABLE VII

LENGTH OF TEACHING WEEK IN 60-MINUTE HOURS PER TEACHER IN ENGLISH AND MATHEMATICS

ENGLISH		MATHEMATICS	
School	Hours Weekly per Teacher	School	Hours Weekly per Teacher
Washington, Mo	30	Washington, Mo	30
Elgin	28	Mishawaka	30
Mishawaka	27	Elgin	28
Bonner Springs	27	Noblesville	27
Norfolk	27	Russell	27
Russell	27	Booneville	24
Maple Lake	26	Morgan Park	24
Granite City	26	Bonner Springs	24
Noblesville	25	Granite City	23
Booneville	24	Brazil	23
Morgan Park	24	San Antonio	23
Junction City	23	Mt. Carroll	23
Mt. Carroll	23	Junction City	23
San Antonio	22	East Chicago	23
Rockford	22	Rockford	23
Brazil	22	Maple Lake	23
East Aurora	21	East Aurora	23
DeKalb	21	DeKalb	23
Waukegan	20	Norfolk	22
Leavenworth	20	Harvey	22
East Chicago	19	Waukegan	20
Greensburg	19	Leavenworth	20
Harvey	18	South Bend	20
South Bend	18	Greensburg	18
University	15	University	15

In making administrative readjustments by way of regulating unit costs, it would appear desirable in the case of certain of the high schools to lengthen the teaching day of the teachers. If the consensus of practice is indicative of right adjustments, then certain other high schools need to diminish the length of the teaching

day. In certain schools the teachers seem to be underworked, while in others they seem to be overworking. This is of course upon the presumption that all of these high schools are aiming at the same kind of results in the various subjects. Since the needs of youth are much the same everywhere in amount and quality of training the assumption would seem to be a fair one.



The variations in the length of the teaching week noted in the case of English and mathematics are to be found in all of the subjects. Table VIII shows the median length of teaching week in sixty-minute hours for each of the various subjects, and also the quartile range for each of the subjects. It shows where consensus of practice places the longer week and where it places the shorter week.

TABLE VIII

LENGTH OF TEACHING WEEK PER TEACHER BY SUBJECTS

	Hours (60 Minutes) per Teacher per Week	"Zone of Safety"
Agriculture	25.4	23–28 hours
Household occupations	24.3	21–28 "
Commercial	24.1	23–27 "
Normal training	23.6	20–27 "
English	23.3	20–26 "
Mathematics	23.3	22–26 "
Latin	23.2	21–26 "
Modern languages	23.2	20–26 "
Shopwork	23.1	21–26 "
History	23.0	20–26 "
Music	22.9	15–25 "
Drawing	22.6	21–27 "
Science	22.5	20–25 "
Physical training	22.0	19–25 "

TEACHERS' SALARIES

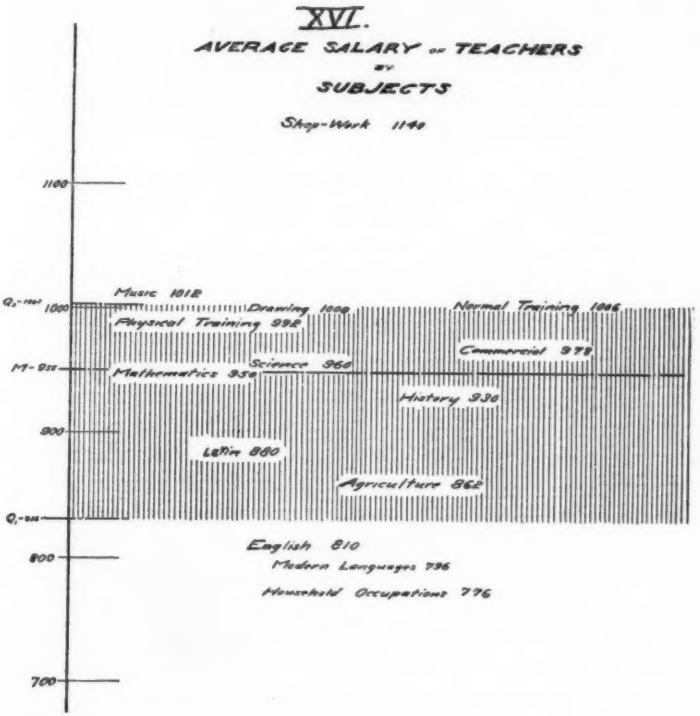
That the unit costs in these twenty-five cities vary because of differences in the teachers' salaries is sufficiently well known. In English, for example, salaries vary from $650 to $1,800; in mathe-

TABLE IX

AVERAGE SALARY OF TEACHERS BY SUBJECTS

Shopwork	$1,140
Music	1,012
Normal training	1,006
Drawing	1,000
Physical training	992
Commercial	978
Science	960
Mathematics	950
History	930
Latin	880
Agriculture	862
English	810
Modern languages	796
Household occupations	776

matics the variation is from $600 to $1,650; and so on through the entire list of subjects. Table IX shows that the standard cost of different subjects is due in considerable measure to differences in the average salary paid. The most expensive subject per thousand



student-hours is manual training. For this too the average salary paid is the highest. A general dissemination of information as to the average salaries paid for different subjects ought to have in time an influence in regulating the supply of teachers so as more nearly to equate the salaries paid. None of these average salaries are high, but it is difficult to justify the difference between household occupations at one end of the scale and shopwork at the other.

There probably can be no real reasons for paying teachers of English and of modern languages so much less than teachers of mathematics and science, except that the supply of teachers for English is greater than the supply for the other subjects. Science and mathematics are so much less remunerative than shopwork for the same reason. While all salaries ought to rise, the equation of salaries can be brought about automatically by a general diffusion of information as to the different levels of remuneration in the teaching of different subjects, thus encouraging fewer to take the subjects which pay less and encouraging more to take the subjects that pay more.

Chart XVI shows graphically the different levels of salaries for the different subjects. The subject needs to be worked out carefully for the high schools of the whole country, and classified regionally and by size of high school or of city in which located.

THE PROBLEM OF INDIVIDUAL DIFFERENCES IN THE TEACHING OF SECONDARY-SCHOOL MATHEMATICS

RALEIGH SCHORLING
Instructor in Mathematics in the University of Chicago High School

In making a study of practice teaching in secondary mathematics the writer sent a questionnaire to the various institutions which are at present offering practice-teaching courses. The general aim of the survey is to reveal and organize the technique involved in the administering of a course in practice teaching of high-school mathematics.

The question which was answered with greatest interest deals with the general problem of individual differences. In the survey the question was stated as follows: "What instructions are given (to practice teachers) to meet individual differences of high-school students?" In order to focus particular attention to the two extremes the two following duplicating questions were included: "(1) How is the practice teacher taught to deal with the slow student? (2) With the fast worker?"

The writer proposes (1) to present a list of current practices as revealed by the responses to the questionnaire, (2) to study the validity of these practices, (3) to discuss in detail the proper technique involved in dealing with the slow student. Practical devices aiming to meet the needs of the fast worker will be presented in a later number of the *School Review*.

The reader would find it most interesting and profitable to read the forty-five replies received. Obviously space is here not available. It is possible here to submit a few typical examples, to present a summary of current practices gleaned from this material, and to give the assurance that in the near future this material will be published in another connection.

TYPICAL RESPONSES

INDIANA STATE NORMAL

a) Careful distribution of questions; suggestions for additional work by strong pupils; occasional permission for strong pupils to assist weaker pupils; emphasis on the fact that pupils are to be held for individual and not class standards of work.

b) To give especial attention to the slow pupil when a new topic is being developed; to give him individual help in class and occasional help outside of recitation period. The presence of weak pupils in every class necessitates a careful and slow approach to each new topic.

TEACHERS COLLEGE, COLUMBIA

To direct the teaching of new matter especially to him (the slow student). To drill to make sure the slow student understands. Use of bright students to help slow students.

UNIVERSITY OF SOUTHERN CALIFORNIA

Possibilities of the course are always higher than the requirements. In this way the better students are taken care of. Personal help after hours is given to slower students.

COLORADO COLLEGE

Very often slower students are assigned to the practice teacher individually.

UNIVERSITY OF NORTH DAKOTA

Keep bright pupils busy with extra work. Do not hold back the class for the slowest pupil nor go as fast as the brightest one is able to go.

LAKE ERIE COLLEGE, OHIO

The poorer ones are called on for additional oral drill while others are doing board work which is later to be explained to the whole class.

UNIVERSITY OF TEXAS

The teacher sets a minimum for the slow student and encourages each student to do as much as possible beyond this.

UNIVERSITY OF OKLAHOMA

[Reply similar to that of University of Texas.]

PARK COLLEGE, MISSOURI

If possible ascertain the cause. If he is asleep, wake him up. If he is discouraged, coax him. If he is stubborn, rebuke him. If he is physically unable, be very gentle and considerate. [No suggestion is given as to the procedure when student is mentally unable to do the work.]

UNIVERSITY HIGH SCHOOL, CHICAGO

A supervised study class of slow students running throughout the year as a part of the regular program, interscholastic contests, mathematics exhibits, and special work in writing themes dealing with topics of interest to the particular student.

The various methods of dealing with the slow student are: (1) conferences with practice teachers in hours other than class periods. It is obvious that here practice teachers can be of valuable assistance in return for the extra work which they themselves cause the regular instructor. However, this must be definitely organized or the result will be overloading a practice teacher with unprofitable labor. (2) Keeping in mind a definitely organized minimum course of study accompanied by an attempt to have every student accomplish something beyond this. This involves an analysis of the student's difficulty, and the grading of the work commensurate with ability of individual members of class. (3) Supervised classes of study for slow students. (4) Use of the bright students as instructors of the slow students. (5) Division of class on the basis of ability into separate sections. (6) Supplementary problems assigned to fast workers.

MINIMUM COURSES

It is interesting to note that the replies to the survey reflect the importance that is being attached to minimum courses for the different years of high-school mathematics. In recent years the demand for such a course has been particularly insistent. This demand is intimately connected with the subject of "standard units." The advantages of a definitely organized minimum course are: (1) It enables the teachers to adjust work to meet the needs of individual students. (2) It puts in definite form before the student the least that must be accomplished in order to receive a mere passing grade. (3) It forces the attention of teacher and pupils upon the essentials of the course. (4) A minimum course conveys a definite interpretation of the phrase "a year of mathematics" to secondary-school executives and college-admission boards. An examination of current textbooks of secondary-school mathematics leads to the conclusion that it would be easily possible for a national committee to come to definite

agreements as to the knowledge of certain essential topics which should constitute a standard minimum course. Definite suggestions as a basis for such actions are found in the "Tentative Proposals for Minimum Courses," published in *A Review of High-School Mathematics* by Reeve and Schorling (University of Chicago Press). These minimum courses are organized on the basis of a study of textbooks in extensive use.

In the University High School, Chicago, the minimum course bears an intimate relation to the supervised classes of the slow students. All students "below passing" are assigned to a special class of supervised study. "Below passing" is defined as failure to meet the requirements of a definitely organized minimum course for the particular grade.[1] The student reports for such periods until he meets the minimum requirements. If he succeeds in merely meeting the requirements of the minimum course for the year he is given a credit with the sentence attached, "Student must repeat course if he wishes to continue work."

This credit permits student to graduate from high school, but brings pressure to bear upon him to find some subject that he can do with greater profit and success than he has been able to do the course in mathematics with two hours of supervised study throughout the year. On the face of it the scheme would appear to have the effect of reducing the election of mathematics. Statistically this result is not apparent after three years of operation. It is possible that the formulation of a definite minimum goal has the opposite effect.

SECTIONS BASED ON ABILITY

The division of the class into sections on the basis of ability is a method of solving the problem of individual differences that is promising for future experimentation. One argument in its favor is that it takes care equally well of the bright student and the slow student. It is certainly true that the bright student is entitled to as careful consideration as the slow student. It is possible that the enthusiasm of many brilliant first-year mathe-

[1] For a detailed description of the method of conducting special study classes see Breslich, "Supervised Study," *Thirteenth Yearbook of the Society for the Study of Education.*

matics students is killed by neglect. It is to be regretted that the institutions reporting that they employ the method of dividing the classes on the basis of ability did not report results in greater detail. In every case the experiment is described in general terms.

In a number of schools in the Middle West, e.g., Cicero Township High School, Illinois, and Elkart, Indiana, the method is employed and the claim is made that it operates to the benefit of both the fast workers and the slow workers. If this is true, then the reorganization of mathematics classes of large school systems on this basis should certainly not be delayed. It is to be hoped that definite results may be published by the schools which are operating under this system.

BRIGHT STUDENTS AS INSTRUCTORS OF SLOW STUDENTS

The use of bright students as instructors of the slow workers raises certain fundamental questions: (1) Is there tangible evidence that the slow student is really benefited? (2) Is the process to be learned shown by the bright student as an abstract process or is it taught to the slow student in a rationalized form? (3) Just what effect has classroom communication on mathematical subjects by the members of the class on the learning process? The writer believes that these questions should be answered by definite experiments.

The writer carried out an experiment in the year 1913–14 with the hope of having these questions answered in his own mind. Two classes in the second semester of second-year mathematics (geometry emphasized in this course) were used in the experiment. The two classes recited in successive periods. The following groups were arbitrarily ruled out of the experiment: (1) students who were repeating the course, (2) students who were tutored or assigned to supervised-study classes, (3) students who dropped the course before the close of the experiment or who were absent five or more days during the experiment. This elimination left twenty students in each section.

The relative ability of the two classes and the ranking of the individual students were determined. Since the instructors in the University High School report grades of pupils in multiples of

5, the students of the two classes were distributed in various groups corresponding to the multiples of 5. The group to which an individual pupil was assigned was determined by adding the grades of the three preceding semesters of high-school work and the mid-semester grade of the current semester. This sum was divided by 4 and the student assigned to the multiple of 5 group nearest this quotient; e.g., a student having the grades 95, 95, 90, 95, with a sum 375 and a quotient of 93.75, was assigned to 95 or A+ group. Table I shows the relative standing of the individual students and the comparative strength of the two classes. The first class will be termed the A section and the class reciting the next period the B section.

If the number of students in each group is multiplied by the number at the top of each column and if these products are added, Section A totals 1,580 points whereas Section B totals 1,540. The inference of these figures is that Section A was the stronger section by 40 points. The table also shows a more nearly uniform distribution for Section A. These conclusions agreed with the general opinion held by the mathematics faculty concerning these two sections.

A series of twelve lessons, identical in content, was given to the two sections. The instructor taught each lesson inductively at the beginning of each period. This occupied approximately one-third of the recitation period. For the remaining two-thirds of the period the pupils of Section B worked independently under the supervision of the instructor. Most of the work was done in notebooks at desks. The pupils were also requested to do all home work independently. It is believed that this request was carried out to the desired degree. On the other hand the students of Section A were asked to work in groups at desks and at blackboard. Here advantage was taken of natural groupings. In such cases where pupils did not voluntarily work in groups, they were arbitrarily paired at desks. Furthermore, students were asked to gain as much help as possible from each other in the preparation of home work. In short, the instructor discouraged independent work in the last thirty minutes of each recitation and in the preparation of home work. After eight recitations the two classes

TABLE I

	60	65	70	75	80	85	90	95
Section A	Van	Agar Rogers	Carry Smith Falkenau	Albright Reber Antoine	Frazier Church Stieglitz	Kimball Howe Noble	Friedman Mallory Zeisler	Edwards Schulman
Section B	Bolte Miller	Sprochule Strauss Sully	Berg Porter	Bensley Eisenrath Hummel	Sulzberger Budinger Foreman	Van Pelt O'Connor Kuh	Clark Mayer Davis	Fake

were given the same examination covering two successive periods. A second identical test was given to both classes at the end of twelve recitations. All papers were graded by colleagues of the instructor. The students were distributed in groups by the same method which determined the relative strength of the two classes. Table II reflects the result of these two examinations.

STUDY OF TABLE II

1. Multiplying the number of students in each group by the figure at the top of each column shows Section A to have a strength of 1,540; Section B, 1,515.

2. Section A has a total negative displacement of 16, a positive displacement of 8, total 24. Section B has a negative displacement of 9, a positive displacement of 4, total 13. The positive displacements of Section A are not numerous in the upper ranks; those of Section B reach as far down as 70.

3. Section A no longer shows a uniform distribution; the 60, 65, and 70 groups are almost depleted. Section B shows approximately the same degree of uniformity as in Table I.

The most obvious fact is that something has been functioning as a disturbing factor in the uniform distribution of Section A. This disturbing influence has been operating negatively among the students at the two extremes, the slow workers and the very good students. A few students in ranks 65 and 70 have been helped but the greater number have been crowded into lower ranks. A considerable number of the good students have been helped, but some of the very best members of the class have for the first time in four semesters of high-school work been unable to hold their positions. Finally, it is probably true that this disturbing factor is the change in the method of teaching Section A.

At the end of the series of lessons described above the method was reversed; i.e., after the new material had been taught by identically the same method to both classes, Section A now worked independently and Section B worked in groups. The results of examinations given at the close of the experiment are shown in Table III.

TABLE II

	Below 60	60	65	70	75	80	85	90	95
Section A working in groups	Van (−3)	Agar (−1) Rogers (−1) Smith (−2) Falkenau (−2)	Antoine (−2)		Frazier (−1)	Carry (2) Albright (1) Reber (1) Kimball (−1)	Church (1) Friedman (−1) Mallory (−1) Stieglitz (1)	Noble (1) Howe (1) Edwards (−1) Zeisler	Schulman
Section B working independently	Miller (−2) Bolte (−2)	Hummel (−3)	Strauss Sully	Bensley (−1) Sprochule (1) Berg	Porter (1) Eisenrath	Budinger Foreman Sulzberger	Kuh Mayer (−1) Van Pelt	Clark O'Connor (1)	Fake Davis (1)

The figures in parentheses indicate the number of displacements from the position held in Table I; e.g., (−2) after Smith of Section A indicates that the grade received is 10 per cent lower than the office records show in Table I, and (1) after Porter of Section B indicates that Porter now in the 75 group is 5 per cent higher than his position in Table I. The (−2) after Bolte indicates an average of 50 on the three-day examinations.

TABLE III

	Below	60	65	70	75	80	85	90	95
Section A working independently	(50) Van (−2)	Agar (−1)	Smith (−1) Antoine (−2)	Rogers (1) Falkenau Frazier (−2)	Church (−1) Albright Carry (1)	Reber (1) Zeisler (−2)	Stieglitz (1) Kimball	Noble (1) Mallory Friedman	Schulman Edwards Howe (2)
Section B working in groups	(55) Strauss (−2) (60) Hummel (−3) (50) Miller (−2) (50) Bolte (−2)	Sully (−1)	Bensley (−2)	Eisenrath (−1)	Porter (1) Sprochule (2)	Mayer (−2) Sulzberger Berg (2)	Foreman (1) Clark (−1) O'Connor Davis (−1)	Kuh (1) Budinger (2) Van Pelt (1)	Fake

1. Section A now shows a strength of 1,560 as compared with 1,505 for Section B. The sections are now farther apart than at any other time. It is true that the totals of the two tables are not comparable; however, in the last examination Section A was able to raise its total grade from 1,540 to 1,560, while Section B experienced a further drop from 1,515 to 1,505.

2. Section A is regaining its former uniformity, whereas Section B now shows all the evidences of the disturbing factor of a change of method revealed by Table III for Section A.

3. Section A shows a displacement of (−11) from the corresponding positions in Table I, a positive 7, total 18. This is a gain of 5 in the negative and a loss of 1, or an advance of 6 toward its former strength. On the other hand Section B has 17 negative displacements and 10 positive, total 27. The negative displacement is 8 units larger and the positive 6 units larger. Moreover the distribution of these displacements is the important characteristic. It is possible that this weaker section is more seriously affected by the change of method. Furthermore, Section A may still be laboring under the effects of the first part of the experiment. If so the results are all the more significant.

4. The following interesting facts were discovered: (1) Of the students in Section A in rank 75 or higher, 71 per cent preferred to work independently; in Section B 77 per cent of the same type preferred independent work. (2) Of the students in Section A of rank lower than 75, $66\frac{2}{3}$ per cent preferred group work, and the same was found to be true of 70 per cent of Section B. This was in spite of the fact that a large number received lower grades. This preference may be due to the fact that the group study enabled them to work with greater comfort in class inasmuch as it was possible for them to conceal their weakness in the work which was partly some other student's. (3) The students in groups 75 or higher were in no way influenced by the views of the instructor as to what constitutes a proper atmosphere for effective classroom work. The instructor preferred decidedly an informal recitation which barely falls short of confusion. (4) Short tests of two questions were given to each section ten recitation days after the same question had been given on the previous tests involved in the fore-

going tables. The purpose was to test the comparative amount of information retained by the two sections. The average of Section A (group work) was 68.2; of Section B (independent) 70.3. On the second test Section A (working independently) averaged 76.6 and Section B (group work) averaged 69.9. In both cases the short tests were given without review or warning. If a generalization is possible it must certainly be that mathematical material gained by independent study is retained to a higher degree. (5) The last part of the experiment was difficult to carry out because the material did not adapt itself readily to group work. The teaching could not possibly be done in one-third of the time in either section and in many cases the supervised study was a mere fraction of the total time. It is obvious that the method of the recitation is not independent of subject-matter; on the contrary, method is dictated by subject-matter.

The generalization of this experiment is not conclusive. Indeed, that is itself one of the generalizations. This discussion emphasizes the necessity of further experiments along the same lines on the part of the schools which report that they are using the fast workers as helpers of the slow workers as an effective means of attacking the problem of individual differences. It is just possible that the fast workers are not only not helping the slow workers but are actually weakening them. If so it means that the mathematical theory in question is shown as an abstract method of getting desired results and is not taught as a rationalized process. Furthermore it is possible that the fast worker is seriously retarded and that interest is decreased. It may be far more profitable for him to advance to new work or spend the time in applying theory to new problems than to be "showing" his classmates problems which he has thought through. At any rate the one point here emphasized is that the assumption that both the slow student and the fast worker are profited by the method is unwarranted.

FUNDAMENTAL ASPECTS OF THE PROBLEM

Thus far we have discussed four of the five current practices which affect the slow worker. We shall now turn to the discussion of the three fundamental principles which underlie these methods.

The principles upon which a satisfactory solution of the problem must be based may be formulated as follows:

(1) Regulating the rate of the presentation of new subject-matter to the ability of the majority of the class regardless of the rate at which those at the extremes, the unusually fast or very slow workers, are able to progress. This is to be accomplished by the consciousness of well-defined standards on the part of the teacher. (2) Providing extra instruction in supervised study for the slow workers. This instruction may be given either as part of the regular recitation, or in a special period which constitutes a part of the regular program; fundamentally this means teaching the slow worker how to study. (3) Providing profitable supplementary activities for the fast workers that will stimulate their enthusiasm for the subject.

Corresponding to the three principles set forth, there are three types of teachers: (1) The one who teaches to the greater number falling between the extremes, neglecting the failing students either because he does not have time to give them the required special attention or because he believes that a certain number are doomed to failure anyway or because it is necessary to fail a considerable number in order to justify the claim that he is giving a rigorous course, and neglecting the excellent students because he believes they will advance in spite of his neglect. (2) The conscientious plodder who believes it to be his special mission to teach the slow student. This is the type of teacher who will hold up the advance of a whole class by an inductive series of questions directed to the one student who fails to see the point. A common characteristic of this teacher is his inability to keep up with the schedule of the department, under the plea of thoroughness. (3) The teacher who directs his lessons directly to the excellent student. He loves his subject and moves at a constant, accelerated rate because of the reaction he gets from the few fast workers. At the end of the semester he either fails an indefensibly large number or passes a great number who cannot carry the work with the next instructor. The instructor of university mathematics needs to guard against the tendency to fall into this group.

TEACHING THE SLOW WORKER HOW TO STUDY

Special reference has been made to the complete survey and experiments of supervised study of slow workers made by Breslich. Fundamentally the problem consists in teaching pupils how to study. The difficulty of the problem and the psychological principle that underlie the solution are set forth in detail in Judd, *The Psychology of High-School Subjects*. Parker, in *Methods of Teaching in High Schools*, formulates practical pedagogical principles of supervised study with numerous examples of applications of these principles. The writer believes it worth while to direct attention to a few of the more significant attempts to solve this problem on the practical side.

Perhaps the best known of these studies is the Batavia plan, organized by Superintendent J. Kennedy of Batavia, New York. This scheme places a number of required supervised-study periods in the daily program and requires the teacher to use them for directing pupils who study silently at desks. A modified form of this plan is found in Joliet, Illinois, where the regular forty-minute period set aside for instruction in mathematics is followed by a second period devoted to supervised study. In a number of places where the Batavia plan or modified forms have been used, teachers insist on using the whole time given them for recitation purposes of the traditional type unless the supervised study is made a requirement. This tendency on the part of teachers can be overcome if teachers in training are taught to distribute the supervised study throughout the recitation period, giving such work at those psychological moments when it will function most effectively.

A third method is illustrated by the Reavis experiment. In this experiment each student makes out a definite program of study for the term. The school brings such pressure to bear upon the student as will make the student conscientiously attempt to carry out this program. The measured evidence submitted by Mr. Reavis is worthy of careful study.

A formal attempt to teach pupils how to study is illustrated by the "Study Helps" formulated by the faculty of the University

High School, Chicago. A copy of "Study Helps" is submitted below. These definite suggestions are for the most part due directly to the experience of supervising teachers in supervised-study classes of slow workers in mathematics. Valuable suggestions were given by the school librarian. A few are the suggestions of professors of psychology and methods in the School of Education.

STUDY HELPS

For Students in the University High School

The habits of study formed in school are of greater importance than the subjects mastered. The following suggestions, if carefully followed, will help you make your mind an efficient tool. Your daily aim should be to learn your lesson in less time, or to learn it better in the same time.

1. Make out a definite daily program, arranging for a definite time for each study. You will thus form the habit of concentrating your thoughts on the subject at that time.

2. Provide yourself with the material the lesson requires; have on hand maps, ruler, compass, special paper needed, etc.

3. Understand the lesson assignment. Learn to take notes on the suggestions given by the teacher when the lesson is assigned. Take down accurately any references given by the teacher. Should a reference be of special importance, star it so that you may readily find it. Pick out the important topics of the lesson before beginning your study.

4. In the proper use of a textbook, the following devices will be found helpful: index, appendix, footnotes, maps, illustrations, vocabulary, etc. Learn to use your textbook, as it will help you to use other books. Therefore understand the purpose of the devices named above and use them freely.

5. Do not lose time getting ready for study. Sit down and begin to work at once. Concentrate on your work, i.e., put your mind on it and let nothing disturb you. Have the will to learn.

6. In many kinds of work it is best to go over the lesson quickly, then to go over it again carefully; e.g., before beginning to solve a problem in mathematics read it through and be sure you understand what is to be proved before beginning its solution; in translating a foreign language, read the passage through and see how much you can understand before consulting the vocabulary.

7. Do individual study. Learn to form your own judgments, to work your own problems. Individual study is honest study.

8. Try to put the facts you are learning into practical use if possible. Apply them to present-day conditions. Illustrate them in terms familiar to you.

9. Take an interest in the subjects taught in school. Read the periodical literature concerning these. Talk to your parents about your school work. Discuss with them points that interest you.

10. Review your lessons frequently. If there were points you did not understand, the review will help you to master them.

11. Prepare each lesson every day. The habit of meeting each requirement punctually is of extreme importance.

METHOD OF IMPRESSING STUDENTS WITH THE IMPORTANCE OF "STUDY HELPS"

When the faculty had adopted the "Study Helps" a special day was set for a campaign designed to impress the student with the importance of these suggestions. Each instructor distributed copies to the students and requested that they be pasted in the textbooks. Copies were posted on bulletin boards. A part of every recitation throughout the day was devoted to the discussion of the eleven suggestions. Special attention was given to them in the library. In later recitations a number of the faculty led informal discussions calculated to discover the value received by the members of the class. The English department used "Study Helps" as a subject for a theme.

The scheme was considered seriously by the great majority of students, particularly the upper classmen. It is not possible to submit measured results showing the efficiency of this scheme. However, it is the consensus of opinion among faculty members and parents that much good was derived.

Mathematics teachers realize the importance of the problem of individual differences. The programs of recent meetings are sufficient evidence. In accord with our American ideals most of the efforts have been directed to the needs of the slow worker. This article aims to supplement the valuable articles on that phase of the subject which have recently been published. On the other hand, the fast worker has been wholly neglected in spite of the general conviction that he is entitled to consideration. In a later article the writer proposes to discuss practical devices aiming to meet the needs of the fast worker in mathematics.

SEGREGATION AT THE BROADWAY HIGH SCHOOL, SEATTLE

THOMAS R. COLE
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There has been more or less discussion in Seattle for some time relative to the advisability of giving instruction to the boys and girls separately in the high schools. Some have even gone so far as to urge separate high schools and have indorsed this policy more on account of moral reasons. Those who have favored instruction in segregated classes, but not in separate schools, are moved to do so, not for moral or social reasons, but rather for purely educational betterment.

It is held that as boys, as a class, between the ages of fourteen and seventeen or eighteen differ in point of maturity and mental alertness from girls of the same age, it is better for them and also for the girls to be instructed separately, because neither responds or reacts in the same manner.

The Board of Education, after giving the matter careful consideration, decided at the opening of the last school year to give separate instruction to boys and girls in one of the high schools, and Broadway, being the largest school, thereby furnishing the easiest conditions, was chosen for the experiment. The segregation was made as thorough as possible without increasing unnecessarily the cost of operation. The number of boys', girls', and mixed classes for the first semester was as given in Table I.

The segregation of classes for the second semester was in nearly the same proportion.

The boys' classes were assigned to men teachers and the girls' classes to women teachers, as far as it was possible to do so.

It might be said that the pupils accepted the new plan in the best of spirit and did much to give it a fair test. There was more objection on the part of the girls and their parents than there was on the part of the boys. The teachers were divided in opinion as to the wisdom of segregation, but were glad to give it a trial.

At the close of the first semester the reports showed that the boys had improved in scholastic grades in nearly all of the subjects, while the girls' record did not show much, if any, improvement over the same period of the preceding year. The number of boys on the honor roll (receiving 4 E's or better) increased 102 per cent while the girls increased only 6 per cent. There is but little doubt that by having the boys and girls in separate classes the standard of marking changed somewhat. In the English work, where the boys had formerly competed with the girls somewhat at a disadvantage, and were graded accordingly, we saw the greatest change. The number of boys doing "G" work or better in English increased 9 per cent, while the girls showed no gain.

TABLE I

	Boys' Classes	Girls' Classes	Mixed Classes
English	29	28	6
Mathematics	21	18	2
History	17	21	3
Latin	8	8	3
French and Spanish	8	11	5
German	6	9	2
Science	7	5	9
Commercial	7	7	13
Manual training	16	18	.....
	119	125	43

Total number of classes, 287.

The second semester gives a better comparison as to the effect of segregation, and I submit in Table II the record made in all subjects for the spring semester of 1914 without segregation and the spring semester of 1915 with segregation.

In compiling a report from the teachers at the close of the year regarding segregation, fifty-three of them expressed their views concerning it. The remaining teachers either had all boys' or all girls' work previously or had no opinion formulated. Twenty-four of the teachers were in favor of segregation and some of their reasons were as follows:

"The boys have been able to have more men teachers, which is of great value to them."

TABLE II

NUMBER PER 100 ENROLLED IN THE DIFFERENT SUBJECTS GETTING "G" OR ABOVE

	English I and II	English I to IV	All English	Algebra I and II	Geometry I and II	All Mathematics	History I and II	History I to IV	All History	Latin I and II	Latin I to IV	All Latin	German I and II	All German	French I and II	French I to IV	All French	Spanish I and II	Spanish I to IV	All Spanish	Commercial, Semesters I and II	Commercial, Semesters I to IV	All Commercial	Manual Arts, Semesters I and II	All Manual Arts	Science I and II	Science I to IV	All Science	All Subjects
Boys:																													
1914: Not segregated	48	53	59	41	44	46	43	45	54	33	39	40	36	39	37	48	48	28	25	26	37	37	37	63	69	50	54	55	49
1915: Segregated....	52	59	60	56	54	53	65	68	69	34	40	40	31	34	38	40	40	59	59	59	33	48	48	61	66	45	45	50	57
Girls:																													
1914: Not segregated	64	71	79	49	48	51	62	61	65	43	46	56	62	68	49	56	56	45	51	53	51	50	45	81	82	68	70	67	65
1915: Segregated ...	67	63	71	54	54	53	59	58	67	40	41	43	69	57	51	49	49	37	37	37	30	42	38	83	81	75	75	68	62

Grades: G equals 80 to 90 per cent; E equals 90 to 100 per cent.

"Helpful, especially for the first two years, because the problem is simplified. The work is approached entirely from one standpoint, that of the girls or that of the boys."

"There is more freedom in talking and I think also in thinking."

"In physics, I have been able to leave out much of the most difficult part for the girls and do more extensive work in the parts in which they are naturally most interested. The work of the boys has been made to include a great deal that I have never found time to touch in mixed classes. I would say that boys have done 30 to 40 per cent more work than in mixed classes. The brighter girls have probably lost the fund of outside information, applications, etc., that the boys contribute to the recitation."

"The standards in a class are nearer what they ought to be as a unit of ability."

Seventeen teachers were opposed to segregation and twelve saw no beneficial results. Some of the reasons given by those opposed were as follows:

"I do not find segregation helpful for intellectual reasons. The girls are too much given to merely memorizing and the boys to discussing and generalizing from insufficient data."

"Discipline is harder in the boys' classes. The boys are not so careful as to body posture and general courtesy when alone."

"As a parent of two girls at Broadway, I feel a distinct loss to them, in that they are deprived of the privilege of having any men teachers except in rare instances."

"My girls have missed the practical suggestions contributed by the boys and my boys have lost the tone and idealism offered by girls."

"Segregation has destroyed variety of interpretation in the study of English literature (advanced classes)."

"Girls' classes are too inert. I miss the energy contributed by the boys."

After considering carefully the improvement made by the pupils in some definite subjects due to segregation, the following recommendation was made to the Superintendent:

1. That we continue as far as possible to segregate all the science classes. We are making a big improvement in the adaptation of the science work best suited for boys and girls.

2. That we segregate the English classes for the first two years. There is little to be gained after the first two years by segregation in the English work and much to be lost by the pupils not being in mixed classes.

3. That we continue to segregate the classes in mathematics.

4. That we segregate history classes for the first year. The very nature of our government and society makes it of advantage to have the advanced history work taught to boys and girls together. They need to get the common viewpoint.

5. That we have no segregation in the foreign languages. We have not profited by segregation in these subjects, and it is difficult to arrange the classes owing to the size.

6. The commercial classes cannot be segregated to any advantage, owing to the nature of the work.

7. The manual-training work segregates itself.

It should be the general policy to assign men as teachers for boys' classes and women for the girls. This rule, however, should be open to *generous exceptions*, as we have women who are better fitted than men for beginning pupils and on the other hand girls should come under the influence of some men teachers during their high-school course. We lessen the general efficiency of the school when we assign teachers more or less arbitrarily as we have done this year.

From the recommendations that I have made, I believe that we would get the largest amount of good from the segregated and mixed classes. The teachers' objections to the present plan would in a large measure be erased.

A PRACTICAL COURSE IN PHONETICS

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The demand for the introduction of phonetics into our modern-language courses, which has been gradually gaining ground in recent years, is likely to receive a new impetus from the fact that the Committee of Ten of the National Education Association on the reorganization of the work in modern languages in our secondary schools is recommending phonetics as a foundation for our modern-language work.

In view of the discussions on phonetics in our educational magazines and books on methods, it is a little difficult to see how the subject can ever be introduced satisfactorily into our language courses. One is invariably left with the impression that, although scientific instruction in phonetics is not demanded, nevertheless the ideal set up is practically impossible of attainment because of the time that would necessarily be involved in the thorough training advocated, and because of the inability of a large number of teachers to give instruction in phonetics on account of lack of training in the subject.

A question immediately arises in the mind of the person seriously considering the introduction of phonetics into the modern-language work: Is a perfect pronunciation so all-important that one is justified in devoting so much time to its acquisition? Should we not be content with a reasonably good pronunciation, which might be secured with a reasonable expenditure of time, and not neglect in the limited time at our disposal the more important features of modern-language work for the less important?

It is with the recognition of the desirability of a reasonably accurate *Aussprache* (such as the Committee of Ten of the National Education Association, as a matter of fact, is advocating) that a course in what might be termed "practical phonetics" is given in connection with some of the work in German in the University of

Chicago High School. Practically all the work is done through imitation. Special directions for producing the correct sounds are given only in individual cases where unusual difficulty is experienced. The first five or six recitations of the course are devoted entirely to drill in the pronunciation of individual sounds or words. After that, this drill is reduced to five or ten minutes daily and in the course of a few weeks is eliminated altogether. A short drill in oral reading is given in connection with each new reading-lesson. If the work at the beginning of the year has been carefully done this drill need consume no more time than is usually given to the oral reading of the new lesson. By thus emphasizing the correct pronunciation of all new material and constantly correcting false pronunciation, the new *Aussprache* gradually becomes a habit on the part of the pupil.

On account of the phonetic spelling of the German language it is considered unnecessary to use the phonetic symbols. Instead of this, two typewritten sheets containing the German vowels and consonants with numerous examples of words containing these sounds are placed in the hands of the pupil. Extracts from this outline are here given:

DIE DEUTSCHEN LANGEN UND KURZEN VOKALE

ā kam, Hahn, nahm, Knabe, haben, Samen, fragen, Vater, schlafen.
ă Mann, Tante, fand, Hand, krank, Hammer, Arm, Garten, Lampe, Land.
ē geben, nehmen, sehen, gehen, Wege, beten, jener, treten, streben.

e IN VOR- UND NACHSILBEN

e Mitte, Blume, finden, Gaben, Apfel, Gipfel, besehen, gesehen.
er Vater, Mutter, Kinder, Zimmer, Hammer, erfinden, erkennen, erhalten.

DIE UMLAUTE

ä Hähne, Kähne, säen, Säge, Säle, Ähre, Fähnrich, ähnlich, Pläne.
ă̈ Männer, Gäste, länger, ärmer, wärmen, härter, älter, kälter.
ö böse, Söhne, schön, töten, Höfe, mögen, lösen, Hönir, hören.

DIE DIPTHONGE

au Haus, Maus, laufen, hinaus, kaufen, brauchen, Trauben, faul.
ei weiss, heissen, Meissen, treiben, schreiben, Weile, bleiben.

DIE KONSONANTEN

b beide, geben; *b*=*p* in gab, gib, hob, lobt, hebt, lieblich.
d das, Kinder; *d*=*t* in Kind, Sand, fand, findst, mündlich.

The long and short vowels, the umlaut vowels, and diphthongs with the glottal catch are taught first. The fact that the German long vowels are longer than the corresponding English vowels and that the short vowels must be made very short and spoken with "pressure" is emphasized. Indeed, throughout the work it is impressed on the mind of the pupils that German cannot be spoken in the indifferent and careless manner peculiar to the American, but that effort and energy are required to secure the vigorous enunciation which characterizes the German. In connection with the work in vowels especial attention is directed to the *e* in final syllables as in *Bote*, *Regen*, and *Löffel* and in words ending in *er* as *Vater*.

Among the consonants the difference between *b*, *d*, and *g* in initial and medial, and in final position, is continually pointed out and a distinction between the voiced and unvoiced *s* is insisted upon. A correct pronunciation of *ch* and *z* is essential, but seldom offers any real difficulty to the pupil. More difficult are the *r* and *l*. The front trilled *r* is taught, as it is almost impossible to acquire the uvular *r*. Even this front *r*, so easy for most pupils, offers an almost insurmountable obstacle to a few. Since months of practice sometimes prove insufficient for the acquisition of this *r*, those pupils who, after reasonable efforts, still fail to produce it are excused from further drill. The final syllable *er*, as in *Vater*, is taught as a very open *ĕ*, the *r* sound frequently disappearing entirely. When all this material has been given, attention is drawn to the German *l*.

Although all of the foregoing elements must be included in this work, the greatest stress is laid on those sounds which differ most from the corresponding English sounds. If those elements in our enunciation of German which most impress the German as being "American" are eliminated, much is done in the way of securing the foreign accent. The elements in the American's *Aussprache* that strike the German most forcibly as being incorrect or "American" are the three consonants *l*, *r*, *s*, the diphthong *au*, the final syllable *er*, and the long vowels *e*, *i*, *o*, and *u*. These sounds indeed stand out so prominently as distinguishing features of the American accent that insistence on accuracy in the enunciation of these

alone will practically transform the pupil's *Aussprache*. Fortunately a reasonably accurate enunciation of these important elements is easily secured.

Since the results indicated above can be attained with such a small investment of time and energy, why not make the aim in our work in phonetics a more practicable one? Courses giving prospective teachers this training could be easily introduced into our training schools for teachers. True, the work here advocated would differ from that now usually given, inasmuch as the practical side would have to be emphasized more than it has been. The teacher-student should not only receive training in the production of the individual sounds but should be drilled in pronunciation in connection with oral reading and speaking, until the German *Aussprache* is at least approximated. Students who have been taught to produce the individual sounds but who continue to speak and read with the American accent, as is now so often the case, cannot be expected to teach the German enunciation. It requires persistent effort to overcome the old tendencies and it is only when the new *Aussprache* has become habitual on the part of the teacher that phonetic instruction can be satisfactorily given by him. In the teachers' colleges and normal schools a more general introduction of courses in phonetics combining practical with scientific features will therefore be necessary before a large number of teachers in our secondary schools can comply with the demand that phonetic instruction be incorporated in our modern-language work.

EDUCATIONAL NEWS AND EDITORIAL COMMENT

Teachers' Unions in Chicago

On August 23 the Rules Committee of the Board of Education passed a resolution forbidding membership in teachers' unions. Teachers are given three months to discontinue their membership. They must state in writing that they are not members of any such prohibited organization and will not become members while they are employed in Chicago. No teacher refusing to make such a statement shall be eligible for promotion or for advancement in salary; any teacher found guilty of violating the prohibitory rules will be liable to a fine, to suspension from service, or to dismissal, at the discretion of the Board. On September 1, the Board by the close vote of 11 to 9 passed the resolution as recommended by the Rules Committee.

To meet this interesting situation the opposing sides have lined up their forces. The Chicago Federation of Labor, reinforced by President Gompers of the National Federation, has rallied to the support of the teachers' union. Other associations of teachers, not the immediate subjects of the Board's displeasure, have joined forces with the party bearing the brunt of the attack. In the meantime appeals to Mayor Thompson have been made only to meet with a short rebuff. Mayor Thompson vigorously resents some of the efforts that have been made by union leaders to influence votes on school affairs, even upon the floor of the City Council. He seems definitely to have lined up with the opposition; while Superintendent Young backs the other side.

It was rumored that the teachers would strike and prevent the opening of the schools in September. However, better counsels seem to have prevailed, and one party to the controversy at least seems to have put the welfare of the school population above factional squabbles. Certain teachers slated for promotion have resigned from the Federation; having done so, it is reported, under the advice of attorneys for the union. In the near future the Mayor is to replace seven members of the Board whose terms expired in July. Rumors that Mrs. Young will resign are again in the air. This entire situation, added to the investigations of the school situation by three different state and city committees, is indicative of a state of affairs which is a disgrace. Religious differences,

political enmities, and personal quarrels are continually thrusting themselves into the management of the schools. A grand hubbub of strife is always with us.

The right of a body of teachers to form a federation for mutual professional interests may be conceded. But the right of the officials of such an organization to affiliate with federations of labor, to lobby on the floor of the City Council, to threaten and to attempt to coerce members of the School Board is entirely a different matter. It is obvious that the city of Chicago could not allow unions among its employees to dictate the terms of their labor or of their wages. The officers of the government must be free from interference of labor agitators. A pertinent illustration is found in the entire absence of unionism among employees of the federal government. In short, militant unionism among workmen, when the opposing party is a private concern with private capital, may be justifiable. That is, for the immediate, beside the point. Militant unionism on the part of employees, when the opposing party is the public, represented by officials duly elected or appointed, is utterly intolerable.

It is to be hoped, therefore, that the Board of Education will be firm enough to compel the abandonment of methods of agitation used in the past, methods in all probability not sanctioned by the rank and file of the teachers, but methods which are dear to the hearts of the labor-agitator type of officers, who unfortunately have been of late years directing the activities of the Chicago Federation of Teachers. It is to be hoped, however, that the city authorities will recognize that there is a distinct sphere within which teachers' unions can work to the great advantage of the schools.

Research and Teaching Efficiency

The report of the University of Wisconsin survey contains answers to 21 questions by 57 educators on the effect of various sorts of research on teaching efficiency. These answers came from college presidents, deans, professors, magazine editors, administrators in public service, and other supervisors of research. While sharp differences of opinion upon the main issue are evident, the preponderance of opinion seems to be in the affirmative: research work does promote teaching efficiency. However, it must be remembered that the report is frankly nothing more than opinion; moreover it is the opinion of men most of whom are themselves interested in research, and many of whom feel called upon

to defend research against what they consider unjustified attacks. On the whole, the report gives very little real information upon the vital issue. One question was: What verifiable evidence has been collected to show how research affects quality of university or college instruction? Of 37 answering, 22 said they knew of no such evidence; and most of the others replied that the only available evidence consisted of opinion and of comparative judgment.

The survey, then, leaves the question about as it was, and as it will remain, unanswered and unanswerable. The truth is that no dogmatic answer, yes or no, is possible. Certain generalizations, large enough to be safe, will have to guide the thinking of those who direct college and university teachers.

The first is that what constitutes teaching efficiency for junior-college students by no means constitutes efficiency for graduate students. In every university there are men who make for differing classes no distinction in methods; some teachers of graduates never rise above undergraduate methods; and, alas, too many teachers of undergraduates, primarily interested in their own research and in their graduate students, foist graduate methods upon junior-college students. It seems to follow that administrators must find some means of determining what men have this power of adaptation; or of compelling all teachers who work with both groups of students to spend more time and effort in modifying their methods of teaching, for one or for the other of the groups. A happy alternative, one toward which all universities, at least, are optimistically aiming, is to relieve men of marked ability from the necessity of earning their daily bread by teaching undergraduates in whom their interest is remote. Professorships endowed for research are greatly to be desired.

But the large majority of students are undergraduates who need carefully organized, definitely blocked-out courses. Their work needs to be intimately supervised by teachers who are primarily interested, for the time being at least, in the personality of the students, and secondarily in the subject-matter of their courses. Nothing but the most conscientious preparation for his own teaching, for each class, for each class period, will suffice. Observation of university teachers tends to show that, on the whole, they are unwilling to give the time and effort required for this careful preparation. The result is the wretched teaching which is often found in the classrooms of the most highly paid and most distinguished in the field of scholarship—college professors.

Of course the careful preparation demanded will take time which to many teachers might be more pleasantly spent in library or in laboratory, preparing this or that article for learned societies or for publication. Nevertheless, the time must be spent. It must not be grudgingly stolen from the teacher's private interests; it must be freely and generously expended. And the conscientious teacher of undergraduates, who by the very bigness of his interest in his profession can for the time, relax his selfish interests—he must be compensated. His compensation is in frequent periods of relief from all teaching, say two days a week; say three months a year. In no other profession are there such abundant leisure periods set aside for activities outside of routine duties. The college or university professor who says he hasn't time to teach undergraduates as he should, and at the same time do sufficient research in his field, is not telling the truth. He means that he will not take time!

High-School Algebra

Commissioner Snedden of Massachusetts thinks that in a discussion of mathematics in secondary education the following points deserve first consideration:

1. The controlling educational purposes to be served by the study of algebra in secondary schools should be definitely formulated.

2. It should be determined how far given organizations of the materials of algebra, or given methods of teaching, result in their realization by pupils taking the study.

3. More specifically he inquires why girls in high school should be required to take algebra, and why women seeking admission to college should be required to present algebra for entrance.

4. For the young man who expects to follow medicine, law, journalism, or theology a good knowledge of algebra is not essential.

Dr. Snedden recommends that algebra be made elective for graduation and admission to college, and that a culture course in mathematics be worked out for students seeking to inform themselves about the world in which they live. Such a course will lead students to appreciate the place of mathematics without attempting to make mathematicians of them.

A committee of The Association of Teachers of Mathematics in New England has published a reply in which certain points are answered as follows:

1. Algebra is a means of expression for abstract thought, thus making accessible in the only possible way a large part of activity of the intellect.

2. There is a conflicting testimony as to how far different organizations of materials of algebra, or different methods of teaching, result in the realization of this purpose.

3. The "culture course" proposed by Dr. Snedden is not considered likely to be a success, unless preceded by an extended study of algebra and geometry. Instead, the committee favors, for graduation, a minimum in mathematics consisting of a one-year course in elementary algebra and geometry of a concrete sort, designed so far as possible to test the pupil's qualifications for future mathematical study.

Dr. Snedden's interesting letter and the reply of the committee deserve most careful study. The letter differs from most criticisms of mathematics because it is constructive rather than destructive. Less conservatism on the part of the friends of mathematics and more constructive criticism by those who oppose it will help to bring about a more thorough reorganization of the body of secondary-school mathematics. The problems demonstrating to what extent the purposes of mathematics are important for all pupils; of testing how far different organizations of the materials of mathematics, or the different methods of teaching, realize the purposes of mathematics; the problem of improving mathematical textbooks and mathematical teaching, are worthy of time and serious efforts of both students of psychology and teachers of mathematics. However, in the absence of lack of knowledge as to the answers to the questions raised by Dr. Snedden, it seems unwise to make mathematics elective for graduation from the general high school. The committee's recommendation of a "one-year course in elementary algebra and geometry of a concrete sort, designed so far as possible to test the pupil's qualifications for future mathematical study," is excellent. It will insure that no pupil is robbed of the opportunity to get a glimpse into this field, usually considered valuable, without working a hardship upon a large number of pupils. The few pupils who have tried faithfully, but cannot complete successfully this course and who do good work in other subjects should certainly be permitted to graduate without mathematics. The number of such students can be greatly reduced by better organization of the material for teaching, by better modes of helping students to study, and by giving more time of the class period to supervised study.

The committee's statement of the controlling purpose of algebra is hardly adequate. Algebra is more than a language. It is a tool, or

technique for thinking quantitatively, more than a mere means of expression. It is an organized agency of quantitative thought, an engine of exact analysis, as well as an expression.

One of the main reasons why the purposes of algebra are not realized for a large number of students is the fact that, as Dr. Snedden says, it is often taught by the teacher with the least preparation. It is not surprising that, under these conditions, success is only apparent and results are unsatisfactory. Before arguing that mathematics be made elective, we should exert our efforts in improving the quality of the teaching, at least until something has been found that has been demonstrated to accomplish the same purposes in a superior way.

E. R. BRESLICH[1]

THE JOHNS HOPKINS COLLEGE FOR TEACHERS

Another step toward the creation of a teachers' college in Baltimore was taken in the recent creation of the degree of Bachelor of Science in Education, by the Johns Hopkins University. This marks a partial fulfilment of the hopes of the university which have been entertained for a number of years. As early as 1910, the university announced its desire of establishing a department for the higher training of teachers as an organic part of the university.

The curriculum leading to the new degree will be based on the college courses for teachers and the summer courses. The former, which were established in 1909, are conducted during the regular session in the afternoons and on Saturdays. The latter have been conducted since 1911. The new degree will be open to men and women on equal terms. The regulations concerning matriculation and the curriculum will be determined by a special advisory committee of the faculty. The title of Director of these courses has been assigned to Professor Edward F. Buchner, who organized and has conducted both of these branches of the university's activities.

[1] See article by E. R. Breslich, *School Review*, XX, 505–15.—EDITOR.

BOOK REVIEWS

Readings in Vocational Guidance. By MEYER BLOOMFIELD. Boston: Ginn & Co., 1915. 8vo, cloth. Pp. xv+723. $2.25.

The volume is valuable because it brings together a vast amount of material which, while well known to the careful student of vocational guidance, is difficult of access. The collection includes addresses before educational conventions, magazine articles, reports, and records of investigations, social, economic, and educational. It also presents a few examples of the kinds of information regarding vocations which may be given to boys and girls, and it discusses the "viewpoint," "foundations," and methodology of vocational guidance.

The "Readings," therefore, are primarily for the one who is making a professional study of the vocational-guidance movement, not for those who are in need of vocational counseling. It will be particularly useful in normal schools and collegiate schools of education.

While one might wish that more space had been given to examples of vocational guidance now being worked out in a few of our American schools, the wisdom of the author's selection must, on the whole, be heartily commended.

FRANK M. LEAVITT

Guide Book to Childhood. By WILLIAM BYRON FORBUSH. Philadelphia: American Institute of Child Life, 1915. Pp. 550. $2.50.

This book has two purposes: first, to pack into the smallest possible compass a compendium of information about childhood; and, second, to give parents the most practical answers to the thousand and one problems of bringing up children.

Part One consists of Outlines of Child Life, a summary of the best that is known about childhood, condensed from the best authorities. These summaries are presented partly in form of graphic charts and partly in terse statements, often numbered for ease in remembering. Each summary closes with a special list of books for further reading. This part includes a unique Calendar of Childhood and Youth, a series of original charts, which outline the usual development of the child at each year from birth to maturity, indicating his physical needs and care, his interests, his activities, his capacity for learning, his social needs, his character and behavior. There are blank lines for personal records and for special suggestions from the Institute regarding the individual child. Study of these charts will interpret to parents the things usual to anticipate in the on-coming life of their children. Supplementing these charts is a more thorough discussion of character development year by

year and of appropriate methods of nurture at each period. These latter suggestions include stories, verses, books, plays, games, and home occupations which are helpful, and other means of service by which the Institute and the parent may co-operate in bringing the child to his fullest development. The Institute requests mothers to make use of these charts, as they develop a working index for valuable personal help with each child as well as for herself.

Part Two opens with a Chart of Parenthood. It consists mainly of several hundred answers to the questions that parents most frequently ask as they meet their daily problems in the home. For those who will go more thoroughly into their work, the best books for parents are listed and described, the organizations that help the home are named and defined, and parents and teachers who wish to study together are given plans for organization and study. There are abundant cross-references between the two parts of the book, and the unusually full index brings to light all the treasures of the volume.

Education for Industrial Workers. By HERMAN SCHNEIDER. School Efficiency Series, edited by PAUL H. HANUS. Yonkers-on-Hudson, N.Y.: World Book Company, 1915.

The author states that in organizing industrial education consideration must be given to the fact that there are two kinds of occupation, energizing and enervating, and also that there are two kinds of training, that which is given prior to entry into gainful occupation and that which accompanies gainful occupation. A scale is suggested running from the most enervating to the most energizing occupations. Judging from the conditions as revealed by the New York Survey, the industrial education given in that city is good, but inadequate. Prevocational schools with broad courses should be encouraged, day continuation schools with compulsory attendance and, to a less extent, part-time co-operative schools should be established, while trade schools and elementary night schools should be abolished, the feeling of co-operation between school and shop should be fostered, and the aim of the school to train for real community efficiency should not be forgotten.

ERNST E. WELLEMEYER

Plane Geometry. By J. W. YOUNG and A. J. SCHWARTZ. New York: Henry Holt & Co., 1915. Pp. x+223.

The study of plane geometry is approached in an informal way by means of a study of geometric drawings. After the pupil has gained an understanding of the fundamental notions of geometry, the work becomes of a formal character. Characteristic features are the use of symmetry as a method of proof, the introduction of trigonometric ratios, and the use of colored auxiliary and construction lines.

FRANCES FENTON BARNARD

Educational Psychology. Vol. I, "The Original Nature of Man." Pp. 327. Vol. II, "Psychology of Learning." Pp. 452. Vol. III, "Mental Work and Fatigue and Individual Differences." By E. L. THORNDIKE. New York: Teachers College, Columbia University, 1913–14. Pp. 408.

These three volumes are in part a revision of the author's previous work by the same title, and in part new material. The first volume on the instincts is new in the main, although it was foreshadowed to some extent by the author's *Notes on Child Study* and in certain passages in other works. The aim of the treatment of the instincts is not merely to trace the general tendencies in the child's reactions, but to determine specifically and in detail the particular situations which call for their instinctive responses, and the exact nature of the responses which are made. Thus, for example, the author is not satisfied by describing in general terms the instinct of fear, but determines, so far as the data which he can find make possible, the exact objects which call forth fear reactions and the precise movements which are made. This procedure leads to the rejection of some of the forms of response which have ordinarily been classed as instincts. It leaves one with the impression that the facts which are described are very fragmentary, and in some cases that the conclusions are unnecessarily negative. Undoubtedly, the effort to catalogue a list of the particular movements which are instinctive, and of the situations to which they constitute a response, puts the matter on more solid ground than have earlier, less definite types of treatment. The author is somewhat iconoclastic in his treatment of certain of the instincts, as, for example, that of imitation. He makes a rather detailed analysis of the possible kinds of reactions which might be regarded as imitative and eliminates them in turn, so as to come to the conclusion that imitative acts are not instinctive. One must take this conclusion in connection with the type of responses which the author takes to be instinctive.

What he appears to mean is that the perception of an action, or of the result of an action, does not have any neural relation to the movements by which the action which is perceived is copied. That is, the child is not capable of learning a new movement through seeing it performed. The connection he sees between the stimulus and the response must previously have been made through some other motive before it can be set up by imitation. That the child has a strong impulse to reproduce the actions which he sees, provided he has previously gained control over the necessary movements, does not seem to be denied by this argument. It is not necessary to go into further details and comment upon the subject-matter of this book. It is an important contribution to the psychology of child development.

Vol. II is an account of the laws and factors of learning. The author adopts and maintains a general standpoint in this volume which is similar to that taken in the first volume. This standpoint is that all learning can be reduced

to a series or group of specific connections or bonds between situations and responses. Moreover, the position taken is that the character of the connection between the stimuli and the responses is identical in all forms of learning. In order to indicate what the nature of these bonds is, the author begins with animal learning, as the representative of the simplest type. The other forms of learning are then reduced to the same type. With this identification of higher types of learning, as represented in problem-solving, with the sensory motor type of learning such as is found in animals or human beings, not all students will agree. The attempt to make such identification, however, is suggestive and stimulating.

After giving a general description of the various classes of learning through the description of typical cases, the author gives in detail various explanations of the factors of the learning process. For example, he discusses the character of the practice-curve, the factors and conditions of improvement, and the limits of improvement. The last section of the book is taken up with a discussion of formal discipline or transfer of training. In this the author recounts the changes which have taken place in opinions regarding this matter, reviews the experiments which have been made before him, and then gives his own attitude upon the question. He is inclined to place relatively more emphasis upon the fact and the importance of the transfer, than he did in his earlier work, which followed his well-known experiments on transfer in perception. Many passages, in fact, throughout the book could be cited in which the view of the mental life as made up not merely of isolated responses but also of general attitudes of mind serves as a basis for the view that training does not merely consist in the development of specific responses but also of general attitudes of mind. For example, a passage on p. 260, in which the interrelation of different factors in improvement is being discussed, the author shows that any particular case of learning is founded upon the results of many forms of previous training. To quote: "Mental abilities or functions are so interdependent that a point when a man begins to improve any one of them simply cannot be found. . . . . The beginning of the improvement of any ability regarded as the inner feature of a man is simply the beginning of all his abilities. In a true and important sense all practice-curves should stick with the first association that the baby forms." This is as emphatic a statement as anyone who believes in the intimate relationship between the various functions of the mental life could wish to make.

The third volume, as the title indicates, discusses the facts of mental work and fatigue and individual differences. The discussion of individual differences is a revision of the author's earlier book, and no especial comment need be made upon it. In the treatment of fatigue the author reiterates his well-known view that fatigue is much less in amount than it has been the custom to believe. He attempts to estimate the amount of decrease in efficiency which may be ascribed to fatigue and at one place puts the estimate at about 10 per cent for work which is continued through several hours. It is well to cor-

rect the popular view that a large amount of impairment in efficiency necessarily follows a prolonged period of work. It is worth remarking, however, that the loss in the case of children is undoubtedly greater than it is for adults, and, furthermore, that the feelings of weariness, which accompany work, though they may not cause a necessary decrease in efficiency for the time being, may have significance in other directions.

The author is critical of the analysis of the fluctuation in efficiency during a single work period, which has been made by Kraepelin and his students. He holds, on the basis of examination of the actual facts of the work period, that the fluctuations which are believed to exist do not actually exist and, further, that the analysis of the causes of these fluctuations after the fact is of little value in their explanation. The type of explanation which is desirable, he says, is one which will enable one to predict what the course of efficiency will be.

The work as a whole is a large contribution to the literature of the educational psychology. It brings together a large amount of data and the author has contributed much penetrating analysis of the facts and criticism of current views. Perhaps, also, the adoption of hypotheses which will not in some cases meet with general agreement may be equally valuable in stimulating thought on the matters which are dealt with.

F. N. FREEMAN

UNIVERSITY OF CHICAGO

The Facilities for Graduate Instruction in Modern Languages in the United States. By CHARLES H. HANDSCHIN, PH.D. (Miami University Publications.) Oxford, Ohio, 1914. Pp. 97.

For many years Professor Handschin has been working on the history of modern-language instruction in this country. The results of his investigation are embodied in his *The Teaching of Modern Languages in the United States* (United States Bureau of Education, Bulletin No. 3, 1913), which is now the standard reference work on the subject. Closely related to the methods of teaching is the matter of training teachers and opportunities for advanced work. The present volume, *Facilities for Graduate Instruction*, etc., has grown out of the preceding and is a part of the author's forthcoming larger work on the history of graduate instruction in modern languages in the United States.

The monograph consists of two parts: A "Who's Who" of the modern-language men, on the order of *American Men of Science* (pp. 9–81), and five statistical tables, exhibiting the relative strength of the institutions under consideration in regard to modern languages (pp. 82–97).

The "Who's Who" is the *pièce de résistance* of the monograph. It gives an alphabetical list of 250 persons, giving graduate instruction in 42 of the foremost institutions of learning, together with their highest academic degree and present rank, the titles of their graduate courses, and a bibliography of their published works. The bibliographies were, in nearly every instance,

obtained from the men themselves and are therefore reliable and up to date. In the case of books, title, place, date, and publisher are given, but for lack of space journal articles could be referred to only by name and volume of the periodical in which they appeared. Although a man's importance cannot be measured by the number of articles he writes, yet it is true that the standing of the journal that prints them usually tells considerable as to the value of an article. In each bibliography the chief line of research into which the articles fall has been indicated. Book reviews have not been enumerated for lack of space and because of their varying importance.

The statistical tables (compiled from the latest college catalogue, report of the United States Commissioner of Education, and from information obtained directly from the institutions) indicate: strong lines of work, number of graduate students and of instructors giving graduate courses, in each of the 42 institutions listed, size of libraries, number and average value of scholarships and fellowships, strong related departments (e.g., comparative philology and literature), and number of A.M.'s and Ph.D.'s (by years) granted during the quinquennium 1908–13.

The booklet will be welcomed by modern-language teachers as well as by the graduate student who wishes to pursue his studies intelligently. For, the strength of the specialist under whose direction a student wishes to study should determine the choice of institution rather than its general reputation or excellence in other lines of work.

WILLIAM F. LUEBKE

STATE UNIVERSITY OF IOWA

How to Teach American History. By JOHN W. WAYLAND. New York: Macmillan, 1914. Pp. x+349. $1.10.

This book is the record of the author's studies and experiences in connection with several years of actual instructing of teachers in the art of teaching history. To the books Professor Wayland has brought along with his studies and experiences his enthusiasm for the subject of history, as well as his knowledge and love for it. A combination of all these as they appear in the book makes it a valuable contribution to the cause of history teaching.

Out of his rich experience in teaching and training others to teach history, the writer brings fresh suggestions on many phases of the subject. He tells us how to make lesson plans, keep notebooks, use dates and sourcebooks, grade quiz and examination papers, make history questions, train pupils to study, and deal with biography and the history story. Besides these he also gives us some excellent mnemonic devices, and devices for review and recreation; tells us why pupils fail in history examinations and why they dislike history; explains the meaning of history, suggests the important aims, surveys the historical field, tells the place and time to begin, and discusses subjects relative to history. The program of history in the grades, in the American

high school, and in the American normal school receives some attention. A chapter is devoted to each field. In all, the book contains thirty chapters and an excellent index.

While the subjects treated cover a wide range, yet the writer's main audience seems to be elementary-school teachers. Twenty-eight of the thirty chapters contain material for such an audience. While high-school teachers will find some excellent suggestions in the book, yet at the same time it is written primarily for grade teachers. The book will no doubt enjoy a large and deserving use as a textbook in normal schools, teachers' training classes, and institutes. In these fields it will do excellent service and much good to the cause of history teaching in the elementary schools.

After reading the book one has the feeling that it is considerably padded. For example, the material in chaps. i, iv, and viii might have been placed in one chapter and much abbreviated. The chapters on history in the high school and in the normal school seem thrown in. They do not even follow the one on history in the grades. It hardly seems worth while to devote eight pages to a list of local histories after referring the reader to Channing, Hart, and Turner's guide. The list for each state as given is too small to be of much value. Yet, I suppose it is not fair to the author to criticize the book for the padding, since he deliberately made it very concrete, definite, and minute.

R. M. T.

UNIVERSITY OF CHICAGO

Outlines of European History, Part I. By JAMES HARRY ROBINSON and JAMES HENRY BREASTED. "Earliest Man, the Orient, Greece, and Rome," by MR. BREASTED. "Europe from the Break-up of the Roman Empire to the Opening of the Eighteenth Century," by MR. ROBINSON. Boston: Ginn & Co.

Robinson and Breasted's new *Outlines of European History*, Part I, is a comprehensive summary of the history of the world from the earliest times to the opening of the eighteenth century. The two volumes of which this is the first are especially adapted for use in high schools giving two years to European history. The break at the opening of the eighteenth century makes it possible to give especial emphasis to modern and contemporary history.

Part I is well proportioned. In round numbers one hundred pages are given to the ancient world, another hundred to Greece, another hundred to Rome; the remaining four hundred pages are devoted to topics relating to the Middle Ages, to the Renaissance, to the Reformation, and to the age of Louis XIV. Throughout the book the treatment is topical; men and details are suppressed for epoch-making movements and conditions. The topics are arranged in strict chronological order. The narrative is interestingly told in a vigorous style.

In illustrations the book has a feature worthy of high commendation. There are 8 colored plates and 237 figures. All are well chosen, distinctly reproduced, and accompanied by an explanatory statement. No student needs to miss the significance of a single picture. In the bibliography covering the period, written by Professor Breasted, additional illustrative matter is pointed out in such a way that teachers and schoolboards can have no difficulty in selecting orders. It is to be regretted that this plan was not followed in the preparation of all the bibliography.

The *Outlines* is replete with maps. They number 28 and half of them are double-page ones.

Each chapter is followed by a set of questions designed to stimulate thought in the preparation of lessons and to aid the student in grasping the essentials in the body of the text. There are marginal headings.

The bibliography is highly commendable. There are references for each chapter grouped in the main under the following headings: general histories, sources, additional readings for specific topics, and illustrative works.

Besides having the topical treatment, the proportion, the maps, the illustrative matter, and the bibliography to commend it, the *Outlines* is admirably printed. It is on the whole well suited for textbook use. It is terse, practical, and business-like. The index is excellent.

HENRY NOBLE SHERWOOD

LA CROSSE, WIS.

State and County Educational Reorganization. The Revised Constitution and School Code of the State of Osceola. By ELLWOOD P. CUBBERLEY, Professor of Education, Leland Stanford Junior University, California. New York: Macmillan, 1914.

In this book the author has given unusually clear and concrete expression to the principles of school administration as they apply to the state and county in the exercise of their educational functions—concrete in the fact that it presents the actual legal instrument through which a hypothetical state is to administer its education.

As such the book takes the organization and style peculiar to this type of legal document, in which respects it represents a rather new departure in educational literature. The aridity customary to legal diction is obviated by a liberal use of footnotes, which are conversational in style and throw much light on the underlying theory of the code. It is a frequent and happy surprise to hear fragments of a debate in the constitutional convention, or to listen to the critical comments of the code commission, at whose hands the old law has just undergone full revision.

Thus we are given at once a finished modern school law, and, partly by inference and partly by discussion, a fairly good history of the evolution of such laws in this country. Replacing the clause "equally open to all" by

"equal opportunity to all" appears to be a very simple little revision, yet it is a definite reinterpretation of the function of the state in education, a step which it has taken years to achieve in practice. Similarly one after another of the most fundamental as well as the most minute problems affecting the development of educational administration is passed in review, as the law is taking form in the hands of the code commission, showing the struggle through which a state passes in attaining the ideal in matters of education.

Osceola frankly commits herself to a strong central control, wherein it is made impossible for a municipal corporation to meddle with the income of the community's schools, or for the children of a poor district to be left without full opportunity for education. Yet there is ample provision for wide use of local initiative in matters which can be handled in that way. The county is made the unit for organization and administration, replacing the previous ineffective and unfair district system, and the appointive principle replaces popular election of all professional officers. The state encourages, but, by a careful system of supervision, also standardizes all parochial and private schools; and broadens the scope of education by including a comprehensive system of libraries, whose functions are closely correlated with those of teaching by offering definite school facilities to inmates of reform, charitable, and penal institutions, and by establishing a science extension division in the state museum. The organization of all these functions under the control of a state board of education is the feature which marks the Osceola system as utopian.

Unlike most other utopias, however, the book contains an appendix which shows the arithmetic of the scheme when applied. Here Osceola is not an imaginary state, but one whose assessed wealth is so much, whose population is so large and distributed in a certain way, making a school problem of given type and dimensions, the exact cost of maintenance of which is figured in detail, derived from sources indicated, and apportioned in accordance with the law; the detailed plan of organization and maintenance of a typical county system is shown to the last detail.

The book must be classed as being quite as profound in its contribution to the theory and practice of educational administration as it is unique in literary form.

J. B. SEARS

STANFORD UNIVERSITY, CAL.

Germany since 1740. By GEORGE MADISON PRIEST. New York and Boston: Ginn & Co., 1915. Pp. 199.

"The rise of modern Germany has long attracted the interest of American readers, but interest has often been baffled by the complexities of German state and national life and by the mass of detail which historians have included in their accounts of Germany." Dr. Priest thus begins the preface to his historical account of modern Germany. Realizing this complexity of historical

material, he has presented here only the most important events in German history since 1740 and has succeeded in producing an outline which by its clear-cut statements and straightforward narrative furnishes a valuable contribution to the understanding and appreciation of present-day Germany.

In this book the author has in mind a definite class of readers, namely, the average reader of English who is interested to know about Germany's recent development and her present relation to other European powers. For this class he writes and makes no attempt to present new historical material.

The book is divided into chapters which treat the great epochs in Germany's development since 1740, each chapter bringing before the mind of the reader the measure of success or failure which was accomplished in the given period. Dr. Priest is primarily a student of literature and hence was able to look away from the minute historical complexity to the larger epoch-making developments—especially as these developments are portrayed in the life and literature of the people. History is here a record, not of petty intrigue or diplomatic controversy, but of the ideas and ideals which form the real basis of national life. The account is not a complete catalogue of historical detail, but is, what is more useful to the inquiring layman, an interpretation of the life and purpose of a nation.

The last chapter of the book, under the title "Germany and William II," is especially worth reading as throwing light upon the present struggle in Europe. Naturally, ardent supporters of German national and international policy will not agree with the concise judgments of this chapter regarding German ideals and German efforts for advancement. Critical estimates are always more or less colored by personal views. But a reading of this chapter will do more for the layman's understanding of European politics in the twentieth century than a study of much of the material on that subject, now issuing from the press.

Excellent maps, especially the one showing the present location and extent of the territories of the United States, Great Britain, and Germany, contribute to a clearer understanding of the text.

HARRY T. COLLINGS

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BOOK-NOTES

KENNEDY, JOSEPH. *Fundamentals in Methods in Elementary Schools.* New York: Macmillan, 1915. $1.25.

Admirable discussion of methods for elementary and rural schools.

FOGHT, HAROLD W. *Rural Denmark and Its Schools.* New York: Macmillan, 1915. $1.40.

A complete and interesting survey.

PALMER, CLAUDE IRWIN, and TAYLOR, DANIEL POMEROY. *Plane Geometry.* Chicago: Scott, Foresman & Co., 1915. $0.80.

SCOTT, HARRY FLETCHER. *Elementary Latin: An Introductory Course.* Chicago: Scott, Foresman & Co., 1915. $1.00.

CRAUFORD, DOUGLAS GORDON, ED. *Hugo's Les Misérables.* New York: Macmillan, 1915.

An abridged edition, setting forth for young readers the story of the life and soul-struggles of Jean Valjean.

GRAVES, FRANK PIERREPONT. *A Student's History of Education.* New York: Macmillan, 1915. $1.25.

CUSHMAN, ESTELLE P., and ANDREWS, MAUDE M. *Songs for the Seasons.* New York: A. S. Barnes Co., 1915. $0.75.

Especially valuable for the rote-songs appropriate for the lower grades.

CURRY, S. S. *The Smile.* Boston: School of Expression, 1915.

A cheerful book on the pedagogical value of cheerfulness.

CURRY, S. S. *How to Add Ten Years to Your Life.* Boston: School of Expression, 1915.

Equally optimistic.

BRESLICH, ERNST R. *First-Year Mathematics for Secondary Schools.* Chicago: The University of Chicago Press, 1915. 4th ed. Pp. xxiv+344. $1.00.

GREENLAW, EDWIN. *Familiar Letters, English and American.* Chicago: Scott, Foresman & Co., 1915.

An excellent addition to the Lake English Classics, containing 118 letters from a great variety of sources. Should be an especially useful book for high-school English departments which are trying to break away from traditional material.

RIETZ, H. L., CATHORNE, A. K., and TAYLOR, E. H. *School Algebra: First Course.* New York: Henry Holt & Co., 1915.

FLAGG, ETTA PROCTOR. *Handbook of Elementary Sewing.* Boston: Little, Brown & Co., 1915. $0.40.

Arranged for the elementary schools of Los Angeles, California. Suggestive for grade teachers.

GIFFORD, JOHN B. *Everyday Arithmetic.* Boston: Little, Brown & Co., 1915.

A practical mental arithmetic for the grades. Indicative of the changing methods in elementary schools.